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The New Bank

Street Writer

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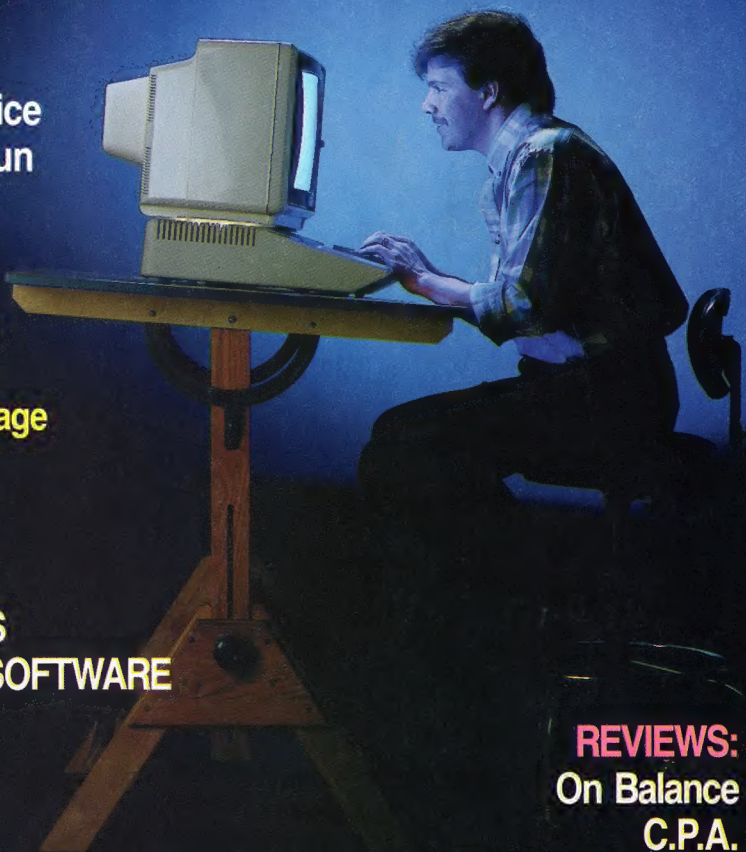
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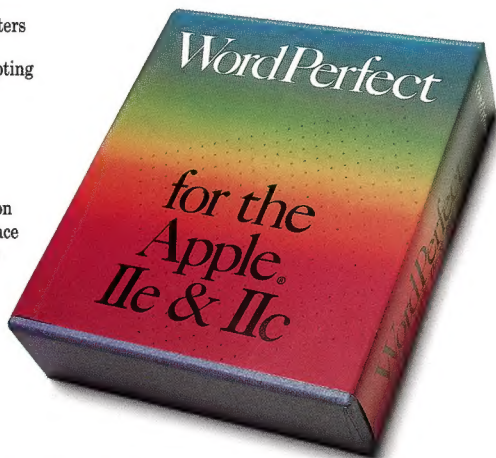
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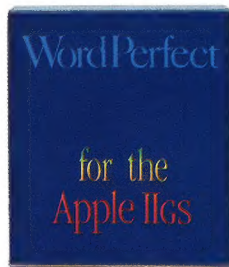
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ON THE COVER

36 The Designing Apple

With an affordable computer-aided design package, you can become your own architect, landscaper, or interior designer.

ARTICLES

44 Pumping Up the Ile

With the proper diet of hardware and software, your Apple Ile can be a powerful machine that pumps data the way Arnold Schwarzenegger pumps iron.

55 The GS Upgrade: Should You Go for It?

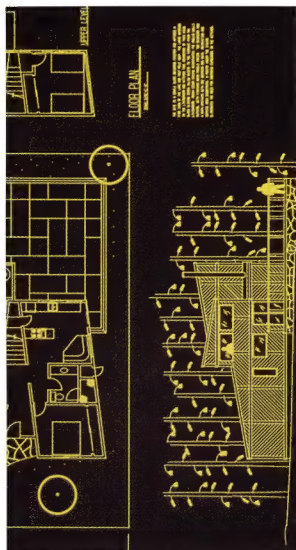
Your Apple Ile motherboard and \$499 will get you the GS upgrade, but this option isn't for everyone.

58 Educational Software: Who's Winning the Race?

Teachers are demanding more sophisticated educational programs, but are software publishers running to meet these needs?

65 The British Are Coming! The British Are Coming!

Is British classroom software more creative, flexible, and educational than American programs? You'll soon have a chance to find out.



TUTORIALS

AppleWorks in Action 70

Creating Return-Address Labels
by Ruth K. Witkin

Applesoft Adviser 75

String Manipulation with MID\$
by Dan Bishop

Mastering the IIGs 84

The GS Monitor and Beyond
by Tom Swan

DEPARTMENTS

inCider's View 8

Too Good to Disappear
by Deborah de Peyster

Letters 10

News Line 16

Boot-Code Battle • Art For Apples' Sake • AppleWorks a Best Seller • Get Rich Quick • Spotlight on . . . Apples and Dolphins • One on One

Status Report 18

Parallel Lines
by Paul Statt

Apple Clinic 20

All Lined Up • ImageWriter Woes • Dates in AppleWorks • Open—and Read—Case • Who Needs Extra RAM? • Foreign Intrigue
by Paul Statt

E.G. For Example 24

MS-DOS: Looking Both Ways
by Eric Grevstad

Reviews 26

On Balance • Clan Practical Accountant • MouseWrite • Micol BASIC • ZBASIC • Beagle Compiler • Brother M-1109AP

New Products 94

Mace on Games 97

Arcade Realism
by Scott Mace

Hints/Techniques 101

Multicolumn Text • ProWriter Print Options • Three-Line Hex/Dec Conversion

Reader Services 110

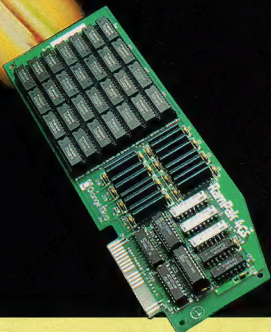
Coming Attractions 110

Editors' Choice 112

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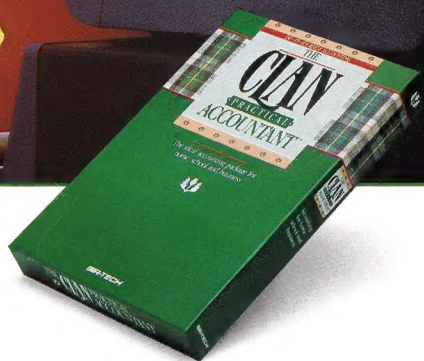
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Too Good to Disappear

by Deborah de Peyster, Editor in Chief



"It's been ten years, and the II still works just fine."

If you were to design a light bulb for yourself, you'd want it to adjust to variable lighting needs and, most of all, never burn out.

Steve Wozniak designed the Apple II for himself and people like him at the Homebrew Computer Club. He built in an attached keyboard, then added color, sound, and eight slots to take care of whatever other functions he'd dream up in the future. He built it to last forever.

But companies don't build products that way. They design products to have a "life cycle" and a "market niche." Clearly, if manufacturers were to produce everlasting light bulbs, they'd put themselves out of business.

As Apple grew into a company, it found the strength of the Apple II was like that of the light bulb that won't burn out. The Apple II could do everything, and it wasn't aging. It didn't allow room for a new follow-up product. And, like the light-bulb maker, Apple wanted new products to make the company grow.

So Apple began to artificially restrain the II. When Apple II users began to need the storage space of hard-disk drives, Apple saw an opening for a new product. Instead of upgrading the II's operating system to support hard disks, it designed a brand-new computer, the Apple III. The Apple III would take over the business market and finally limit the II to education and home use, Apple hoped.

At the same time, though, Steve Wozniak was working with a developer to give the Apple II a new operating system, called ProDOS, to support hard drives. Remember, he was still designing a computer for himself, and planned obsolescence didn't figure into his project.

Apple executives who feared the II with hard disk would compete with the III canceled the ProDOS project nine times. But, as you know, ProDOS finally did arrive, Apple IIs do run hard disks, and the Apple III died. (The III died for many reasons, but

the ongoing strength of the Apple II made finding a place in the market for the III more difficult.)

Apple still had only one product, but it tried again. It introduced the Lisa, a \$10,000 machine that could do almost everything the Apple II could do. But the Apple II cost about \$8000 less.

Apple tried again. This time it introduced the Macintosh—a computer with one disk drive, 128K of RAM, and no software. Meanwhile, the Apple II had tons of great software, two disk drives, and the ability to accommodate memory upgrades. Apple II owners using the machine to run small businesses wondered why Apple was telling them the Macintosh was the company's business machine.

Now Apple has the IIGS. Wozniak was involved in building the GS; if he'd gotten his way it would offer even more than it does. (A 68000 microprocessor was one battle Woz lost. We don't know the details, but we assume the 68000 made the new II too much like the Mac.)

The GS offers everything the Apple II does, plus better sound, improved graphics, and increased processing power. But Apple still says it's not a business computer—it's a home and education machine.

We know differently, though. We know the II is a machine that was designed to fulfill the dreams of users like us. Woz didn't care about market niches or forced obsolescence. He cared only that it was useful and would work for a long time.

It's been ten years, and the II still works just fine. Fortunately for Apple, improvements in technology have given the Macintosh some unique and worthwhile capabilities, too. Maybe in the next few months Apple won't try as hard to impose position on its products and will let users decide how to apply them.

In the meantime, don't be misled by marketing hype. If you still feel your Apple II is the light bulb that won't burn out, you know best. ■

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Up with the Ilc

I disagree with your editorial reply to a letter in the February issue about GS upgrades for the Ilc (p. 8). Certainly, a GS board with slots won't fit inside a Ilc. But the Ilc's "closed architecture" already sports about the same peripheral ports as the GS, and there's no design requirement for fitting the power supply inside the case. With the Mega II already in hand, it won't take an engineering miracle to put the rest of the GS chips onto a Ilc-sized board which, along with a 3½-inch disk drive, could be retrofitted to existing Ilcs.

Actually, I'm pleased with what I've gotten from my Ilc in the last two years. But I'm angry at Apple for supporting Ilc owners with the GS upgrade, while ignoring the rest of us. I paid a lot more for my Ilc (I bought one of the first) than the current list price of a GS. While I don't regret this, I think I deserve the same consideration as every other Apple customer. Perhaps Apple's right now working on a portable GS, just as it followed the introduction of the Ilc with the Ilc. If so, maybe it should tell us about it, or does Apple think "entry-level" computer owners aren't interested in 16-bit computing?

And what about II and II Plus owners? Without their loyal support, Apple wouldn't have lasted long enough to even dream of a GS.

Robert T. Barnett
2640 North West Avenue
Vineland, NJ 08360

Compatibility Questions

The information in Craig Crossman's article, "Running AppleWorks on Your II or II Plus" (January 1987, p. 146), concerning the use of AppleWorks with Applied Engineering's RamFactor card, is incorrect. All the extended AppleWorks features listed in the article aren't available with versions 1.1 and 1.2. Only version 1.3 supports these extended features (5100 lines in the word processor, 5100 records in the database, and so on). AppleWorks 1.1 and 1.2 recognize the RamFactor card only as a ProDOS RAM disk.

I recently purchased a RamFactor to run AppleWorks 1.2 on my Apple II Plus, hoping to have the features listed in Applied Engineering's advertising. I was sorely disappointed, though, to discover the above limitations, which Applied doesn't make clear in its advertising. However, the worst was yet to come, for when I tried to boot my modified AppleWorks disk, the system locked up.

I contacted Applied Engineering and was told that a bug in the modification program prevents AppleWorks 1.2 from working with a Videx 80-column card (even though its advertising and manual say the software is Videx-compatible). Applied couldn't tell me when or if indeed it would fix the bug, and suggested I upgrade to AppleWorks 1.3.

In the meantime, Apple released AppleWorks version 2.0. Before spending the money to upgrade, I talked to Applied Engineering representatives at a local computer show, who told me the modification software wouldn't work with version 2.0 and that Applied had no plans to upgrade the software to include it. They suggested I find an old copy of version 1.3, or dump the II Plus for a ILe.

The bottom line is, if you want to use the II Plus with a RamFactor card for AppleWorks, you'd better have version 1.3. I'm now using Norwich Data Service's PlusWorks-XM, which recognizes the RamFactor with AppleWorks 1.2 and works well with the Videx 80-column card.

Bradley L. Griswold
1662 Westhaven Drive
San Jose, CA 95132

Deleting and Undeleting

The undelete utility in "File Restorer" (January 1987, p. 148) is a useful addition to my utilities floppy. It should be noted, however, that the sectors used by the restored file are still officially deleted and available for reuse later by a new file.

A simple solution is to copy the file with a utility such as FID, which realigns new sectors and protects the file from future allocations. If you copy the file to a separate floppy, then de-

lete the original file, you'll clear the "free-space" portion of the VTOC again. If you don't copy the file, then eventually a new file will overlay one or more of the sectors in your restored file.

Charles S. Pie
815 Leeds Lane
Newark, DE 19711

Das Word Processor

I'm a university student majoring in German; I use my Apple Ilc daily. My Word Juggler program makes writing term papers a breeze. However, I do most of my writing in German. I understand Apple computers are popular in Germany. How could I acquire German programs? A word processor with a German spelling or grammar checker would be extremely helpful.

David Hankel
2114 West 15th Court
Eugene, OR 97402

We know of programs for learning the German language, but couldn't find any written specifically in German. Call the main switchboard at Apple (408-996-1010). Apple produces foreign-language versions of AppleWorks and other programs, and should be able to tell you where to get German programs. —eds.

Success with AppleWorks 2.0

Just when your Success with AppleWorks templates were working fine, along comes AppleWorks 2.0. If you're using these templates with AppleWorks 2.0, changes to the logic prevent the loan-amortization spreadsheet from calculating properly. It works with earlier versions of AppleWorks; the problem is just with version 2.0. To remedy the situation, you'll have to edit two of the formulas.

Load LOAN.EX from your backup copy of Success with AppleWorks. With your cursor on C13, press QA-U to put the principal-paid formula on the entry line. Now enclose C4*12 within parentheses and press the return key.

Next, copy the formula down the column. Leave your cursor on C13

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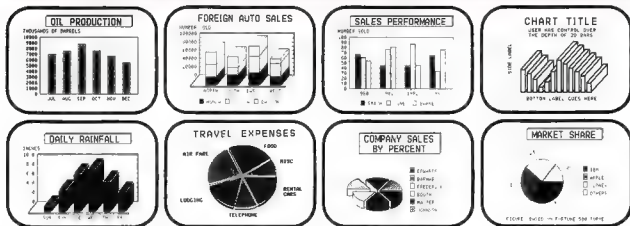


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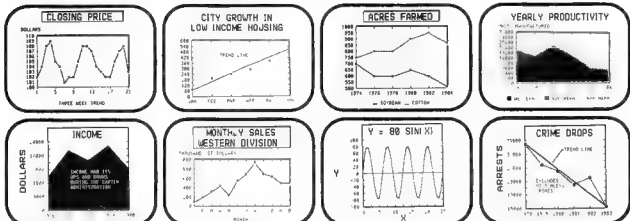
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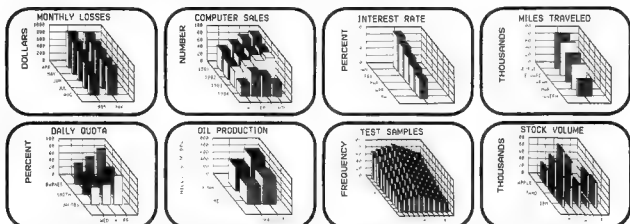
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LETTERS

and press OA-C. Press the return key twice to confirm *Within worksheet* and the source. Press the down-arrow key, type a period, press OA-9 to highlight the cells to C48, and hit the return key again. Type Y to clear the protected cells. To identify the relative and no-change cell references, type R, press the return key twice, and type another R.

The other formula—principal remaining—is handled the same way. With your cursor on D14, press OA-U. Enclose C4*12 within parentheses and press the return key. Copy this formula down the column. When it's time to identify the relative and no-change references, type R, press the return key, and type R twice. Save the LOAN.EX file on disk, then repeat these steps to edit the formulas on LOAN, the blank template.

Reader Jack Elliot kindly alerted me to this problem and provided the solution. If you hit any other snag using AppleWorks 2.0 with Success with AppleWorks, please let me know so that I can pass it on to other readers.

Ruth K. Witkin
5 Patricia Street
Plainview, NY 11803

Spreadsheet Securities

While scanning back issues of *iN-Cider* for something else, my eye caught the article "Spreadsheet Highlighting," by Morton Axler (December 1986, p. 177). The idea looked good so I set about inserting it into my securities spreadsheet, only to find a problem.

I created column J to indicate change (+, -, or no) from the last price (from Axler's article). But I wanted to pick up the last price (which I put in column F) from the last current price (column H), so I set up what I call a *Transmittal* column in column G.

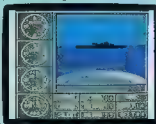
I enter the current price from the latest *Wall Street Journal* listings. When I press OA-K, the value for Last Price is picked up from the Transmittal column, then the Transmittal column picks up a new value from the Current Price column, preparing the spreadsheet for the next session. I've made the Transmittal column only one character wide, as I don't want the values to print.

I have to press OA-K only once, because Last Total, at the bottom row, picks up the last Total of Current Value (in the row above) using calculate by columns. There's more to my

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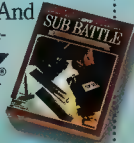
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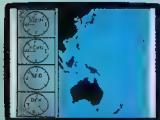
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spreadsheet than this, but the Transmittal column is a valuable part of it.

A. William Neef
4848 Wolf Lake Road
Grass Lake, MI 49240

Good Choice

I was pleased to see Diversi-Copy as your Editors' Choice in the January issue (p. 160). Not only is Diversi-Copy an excellent copy program, but Diversified Software Research is an outstanding organization.

I recently purchased Diversi-Copy to use with my Central Point 3 1/2-inch drive and 512K RamWorks card. It didn't function properly, so I called Diversified Software and explained my problem to a courteous gentleman who said he would look into it. He followed up with a return phone call that same evening. About a week later I received an updated version of the program. I'm happy to say it now functions satisfactorily.

I can't say too much about Diversified Software. The industry needs

more people and companies that are committed to excellence.

Harold Frack
416 St. Davids Road
St. Davids, PA 19087

File Restorations

I neglected to mention that my file restorer utility (Hints/Techniques, January 1987, p. 148) works only under DOS 3.3. I apologize to all who tried to use the restorer with ProDOS.

Furthermore, in case you miss a keystroke, you should change line 1080 to read:

1080 PRINT : NORMAL

My thanks to John Specht for bringing this to my attention.

Charles Toth
2404 Cherokee Street
Adelphi, MD 20783

inCider welcomes readers' comments regarding articles, letters, or other topics of interest. We reserve the right to edit letters for clarity, style, and space. Please address your correspondence to Letters, inCider, Elm Street, Peterborough, NH 03458.

CORRECTIONS

In "Achieving a Personal Best" (December 1986, p. 77), the price of the EyeTyper Model 200 is listed incorrectly under Product Information (p. 82). The correct cost is \$2995.

In our January 1987 issue, the feature "Financing the American Dream" contains a typographical error. In the second column, p. 62, the formula +D18*D11/100 should be placed into cell D19, not cell D18 as stated.


In our February 1987 feature "Striking Gold in Public-Domain Software" (p. 40), we inadvertently omitted the software distributor Dynacomp from our list of sources. Dynacomp is located at P.O. Box 18129, Rochester, NY 14618, (800) 828-6772, (716) 671-6160.

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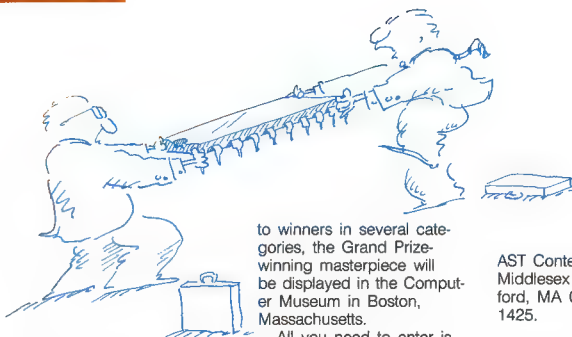
BOOT-CODE BATTLE

It's traditional for Apple Computer to sue anyone who introduces an Apple compatible, but the leading Apple II imitators recently fought an intramural battle. Last January, Franklin Computer Corporation filed a copyright-infringement suit seeking to block sales of the Hong Kong-made Laser 128.

The suit, filed in U.S. District Court in New Jersey, named the Laser's manufacturer, importer (Video Technology of Northbrook, Illinois), nine mail-order dealers, led by Central Point Software of Portland, Oregon, and two Laser retail vendors in New Jersey. Franklin claimed the Laser's ROM startup or boot code was too similar to a boot routine written for Franklin by Language Arts Inc. in 1984. Language Arts, a programming firm headed by Michael Brown, has produced code for both Laser and Franklin. Brown is also president of Central Point Software.

While Franklin admitted that its Ace 500 and 2000 don't actually use the code in question—the firm developed its own boot code later—Franklin retains legal title to it. In addition, Franklin's complaint stated, the Laser "is sold at prices ranging from \$350 to \$400, which is considerably less" than the cost of a Franklin—a difference that "threatens to seriously impact and has already impacted upon" Franklin sales.

Video Technology and Central Point saw the last fact as Franklin's real motivation. "In my personal opinion," Brown told *in-*



Cider, "the whole thing is kind of a last-ditch effort to do legally what you can't do in the marketplace. I think they're...telling their shareholders and themselves. The reason we failed is because somebody stole something from us," and not the real reason, which is that they're not competitive."

In early March, the matter was settled. While the defendants didn't admit infringing, they agreed to stop selling Lasers with the contested code; they're shipping new 128s with a new ROM Franklin agreed not to contest. Besides being "a trivial matter," completed by an independent developer "within a few days," Video Technology president David Gish claimed, the new ROM gives an extra boost to the Laser's Apple-software compatibility. —E.G.

to winners in several categories, the Grand Prize-winning masterpiece will be displayed in the Computer Museum in Boston, Massachusetts.

All you need to enter is an Apple IIgs, AST's VisionPlus, any video camera or VCR, and talent.

Winners in each of three categories (grades 4-6, grades 7-12, and adult) will receive an Apple IIgs system (which, presumably, can back up the GS you used to enter the contest), including Apple RGB monitor, Apple 3½-inch disk drive, and ImageWriter printer. The five runners-up in each category will get an AST RamStakPlus expansion card. And you don't have to be a member of Apple Computer Clubs to enter.

If you're a budding computer artist, or happen to have a IIgs and want a shot at winning another, contact Apple Computer Clubs International, Attn:

AST Contest Entry Kit, 175 Middlesex Turnpike, Bedford, MA 01730, (800) 343-1425. —D.M.

APPLEWORKS A BEST-SELLER

AppleWorks was the best-selling software last Christmas. It wasn't simply the top-selling Apple package—it ousted Lotus 1-2-3 from the number-one spot.

Apple's own word processor/database/spreadsheet combination captured 13 percent of the unit share of software packages sold, according to InfoCorp, a market-research firm in Cupertino, California. If a software store sold 100 programs last Christmas, 13 of them were AppleWorks.

Second place was a photo finish. Lotus 1-2-3, a spreadsheet, database, and graphics package for the IBM PC and compatibles,

ART FOR APPLES' SAKE

Deep down there's a Picasso in everyone, but if traditional brushes and paints haven't brought out the artist in you, maybe a IIgs and AST's VisionPlus video digitizer will.

AST Research, of Irvine, California, in conjunction with Apple Computer Clubs International, is sponsoring the AST Computer Art Contest to give you a chance to show off your talent. While AST will award prizes



convinced nine buyers in 100; The Print Shop, from Broderbund, also placed strongly with 9 percent, but it's available for IBM PCs and Commodores, as well as Apples.

December 1986 was the first month ever that Lotus 1-2-3 failed to finish first. While "the industry" continues to talk about Lotus, Microsoft, new Macs, and 80386 IBM PCs, customers quietly buy AppleWorks.

—P.S.

GET RICH QUICK

If you have a program that's bug-free and ready to boot, you may need someone like Brad Fregger.

Even if you just have a good idea, Fregger could make you some money.

Fregger, who until recently was a software producer at Activision, has founded Software Resources International, an independent production company. That means different things to different programmers. If you have a program that's ready to go, Fregger will act as your agent with the big companies for 15 percent of your profit. For 25 percent, he'll edit your product—smooth the interface, fix bugs, and help write documentation. And if you just have a nifty idea, Fregger can be your producer and help you get together with a programmer and a publisher—for half your take.

Fregger laments that the big companies, like his former employer Activision, "end up playing it safe—conservative—like the motion-picture studio that would rather make *Jaws II* than give a new idea a



Dolphin photo courtesy of COMSTOCK/Russ Kane

You may know that dolphins talk, but do you know the difference between "dolphin clicks" and the "dolphin bang"? Friendly clicks are a kind of dolphin language that's more common than the shocking sound that Dr. Ken Marten, a researcher at Long Marine Labs, University of California, Santa Cruz, calls the "big bang."

"It's only a theory," Marten stresses, but dolphins are thought to produce a noise that can "stun or disorient prey. It's difficult to prove—you can't be right down with the dolphins in the wild, and they don't do it in captivity."

That's where an Apple II comes in. An "almost-real-time power-spectrum analyzer" program lets researchers train captive dolphins to emit the "big bang." Dr. Marten says he likes using the Apple II in research because after he finishes one experiment, he can boot up the AppleWorks word processor and write a grant proposal for the next one.

chance. I'm afraid they may be holding the product of the decade in a drawer somewhere."

Have you got it? Call or write Software Resources International, 1209 West Knickerbocker Drive, Sunnysvale, CA 94087, (408) 738-4311.

—P.S.

ONE ON ONE

Seymour Papert's vision of a computer for every

student gets closer to reality each year. While most classrooms are still far from a one-to-one ratio of students to computers, the numbers have been improving over the past few years.

QED (Quality Education Data), a Denver, Colorado-based research firm, reports that in the 1986-1987 school year, there was one computer for every 38 students in public schools. It wasn't long ago—the 1983-1984 school year, in

fact—that 125 students had to share each computer. In 1984-1985, the ratio dropped to 75 students per micro, and by 1985-1986, 50 students shared each computer. The percentage of schools equipped with micros in the same period increased from 67 percent to 91 percent.

Henry Jay Becker, project director for the newsletter *Instructional Uses of Computers* at Johns Hopkins University, agrees with Papert's vision that students should be one on one with their computers. "A computer is more like a book," he states. "It has to serve one or two children at a time."

Becker estimates that 1.6 million computers are used currently by students in public schools, compared to 250,000 school computers in 1983. He considers 29 to 1 a good student-to-micro ratio; schools that have achieved that ratio include 8732 elementary schools, 4969 senior high schools, and 2906 junior highs.

"Most schools are now getting to the point where they can use computers effectively," Becker notes.

"Until now, [schools] didn't have enough of them. [Computers] were purchased like a VCR or an overhead projector would be, in that a single unit served a whole class."

—L.L.

We're always looking for news of the Apple world. If you're making news, send your press releases and photographs to News Line, inCider, Elm Street, Peterborough, NH 03458.

Parallel Lines

by Paul Statt, Technical Editor



"Why can't your Apple have two hearts beating at once—a 6502 and an 8086?"

A digital computer is really a very simple thing. At its heart beats a machine called a microprocessor, which "executes instructions" very quickly. The instructions don't sound simple to you—they're statements like "decrement index register X"—but to your Apple's 6502 or 65C02 microprocessor, they're as simple as it gets.

The fundamental idea behind computing is that a programmer can make a computer do fantastic things by telling it to do a number of simple things, such as "decrement index register X," in the proper order.

Programs for digital computers are linear: "Do this, then do that, then do another thing." Order counts. You can complicate a program by making it conditional—"If this, do the other thing"—but a program remains a series of instructions. Today's computers can type letters, play games, and phone home by storing in memory and executing a series of radically simple instructions such as "decrement index register X."

Serial processing is sometimes called "von Neumann architecture" after the man who first imagined it. As brilliant as it is, von Neumann architecture has a demon that still haunts our Apple IIs: It's slow.

An Apple II that's running a spreadsheet, for instance, goes through a series of instructions more complicated than you can imagine. The program has to tell the machine to put certain numbers on screen, to add some numbers to others, to get other numbers from disk; the program has to tell the computer everything.

Instructions take time. Your Apple spreadsheet may take only milliseconds to figure "two times two," but your brain does it faster. Your brain isn't a serial processor: Faced with a problem such as two times two, you don't start to "decrement index register X," or anything like that. You answer, "Four."

John von Neumann, the Hungarian-born mathematician (1903–1957) who gave his name to serial processor and program architecture and the bottleneck that impedes them, could, among other intellectual achievements, carry on simultaneous conversations in English and German. He

could do that because his brain, like yours, was a parallel, not a serial, processor: He could "run two programs at once."

Computer programmers who want to mimic minds—artificial-intelligence researchers—are playing with parallel processors. Each of these chips resembles the 6502 in your Apple, but, working in concert, they do more than one job at a time. A set of parallel processors that wanted to "double everyone's salary" in a payroll spreadsheet wouldn't step through the list. It would double all salaries at the same time.

You're as likely to find parallel processors in the home computer you buy next year as you are to find your paycheck doubled next payday. But some home computers today know a cheap trick for getting around the von Neumann bottleneck to work faster: coprocessor chips.

A coprocessor in the Commodore Amiga, for example, alone controls the screen display. This arrangement makes the Amiga faster and lets the central processor use all that memory saved to run two programs at once. It isn't parallel processing—the Amiga still steps through "spreadsheet instruction, communications instruction" alternately in sequence—but it looks as fast as if two programs were running "in parallel."

This "multitasking" isn't available in the Apple II yet. In the meantime, I'd like to see some bright programmer try a different trick to speed up Apple computing. Why can't you buy an MS-DOS coprocessor for your IIe—two hearts beating at once in your machine, a 6502 and an 8086? You could run a telecommunications program on the 8086 while your 6502 runs AppleWorks, for instance.

A coprocessor that *completely* takes over your machine, such as the Z-80 CPM coprocessor for the II, isn't worthy of the name. I hope Applied Engineering has more radical plans for "Little Blue" than "running Lotus 1-2-3 on a IIe." That idea hasn't sold, and never will—but if any company has the imagination to make a pair of microprocessors useful by making them work together, I'll bet it's Applied. ■

by Paul Statt, Technical Editor

Apple Clinic is a forum for discussing Apple II hardware, software, and related subjects. If you have questions or answers, or want to make a statement, write to Apple Clinic, inCider, Elm Street, Peterborough, NH 03458.

All Lined Up

I need to type audiovisual scripts, which are two-column word-processing files. I own an Apple IIe and can't find a single program that will let me create this kind of document. I need to see two columns at once and edit either column. I could set tabs and come up with a two-column display, but it would be difficult to edit.

The local Apple representative told me Apple doesn't consider the IIe a "business" machine and that I should have bought a Mac. But there must be a program out there somewhere I can use.

Frank Scheidt
Rochester, NY

Two-column text seems like a simple concept; I was sure some word processor could do it. But although displaying two columns is a snap, "live" editing in more than one isn't.

Don Thompson, an Apple Writer junkie in California, agrees, but hopes to have the problem licked by the time you read this. Apple Writer is a programmable word processor: You can change the way it works yourself. A lot of people who like to do things their own way, or have special requirements for their word processors, like Apple Writer.

Don has created some Apple Writer modifications that, in his words, "turn it into the full-blown business program Apple never made it." Sounds like just the program for your local dealer's IIe! Call or write Don at 23072 Mullin Road, El Torro, CA 92603, (714) 855-3838.

ImageWriter Woes

I have an Apple IIc and ImageWriter, and am experienced in sending control codes to the printer. I

can't get the printer to accept the sequence that enables optional line feed, though.

According to my ImageWriter manual, the sequence is "Escape I 1" (decimal 27 108 49). I've tried to send it from the keyboard in all these ways:

```
PRINT CHR$(27); "I"  
PRINT CHR$(27); "I"; 1  
PRINT CHR$(27); CHR$(108); CHR$(49)
```

In each case, the printer actually prints 1, indicating that it didn't interpret the numeral as part of the control sequence; my attempts to run an Applesoft program with subscripts result in all subscripts printed at the left margin.

I assume my printer isn't defective, because AppleWorks prints subscripts correctly. Am I missing something simple, or is the ImageWriter holding something back?

Mike Golner
Buffalo, NY

ImageWriters (I'm assuming you're using an "original" ImageWriter, not the II) with serial numbers below 216001 don't understand some control codes—optional line feed is one. But since AppleWorks prints subscripts, I don't think an antiquated ImageWriter is holding you back. The latter two statements you list should do the trick; the first would just print L1. The second and third statements, in a BASIC program, should result in subscripts.

Are you remembering that ProDOS PRINT statements must begin with CONTROL-D (CHR\$(4))?

Dates in AppleWorks

I've set up a seniority list of our school-district employees in the AppleWorks database. In the process of updating the report, I have yet to determine an easy way to increase the number of years each employee has worked by one year every year.

My most recent attempt involved increasing two numbers for each of 150 employees by altering each individual record. Surely there's an easier way.

Lloyd W. Harrington
Laurel, DE

The easiest fix is to use two or three categories in your database where you might have used just one. Instead of using "Date Started" and filling in "May 12, 1987," or whatever, try using "Year Started," "Month Started," and "Day Started." You can't use the word "date" to designate an AppleWorks database file, because AppleWorks would format it automatically—not what you need.

Now you need to create a calculated category: Choose "Create a New (Tables) Format" from the Print a Report menu.

Say the field "Year Started" is in category C. Move the cursor to column C and type Open apple-K (calculate). Now name the calculated category, define its rule, and set the number of decimal places and number of empty spaces you want in the category. The important thing is the rule. If it's 1987 and "Year Started" is in category C, the rule you want is "1987-C." You can edit the rule every year.

When you print a report with this format for seniority, one column will hold a rough approximation of the number of years each employee has worked. I imagine you could write a more complex formula, using "Day Started" and "Month Started" as well, for greater accuracy. If you've ever tried to write a BASIC program that calculates dates, you know it's not a trivial task.

If all you need to know is which employees have been working longest, you can simply create a category called "Start Date" (this time it's important to use the word date) and sort your records on that category.

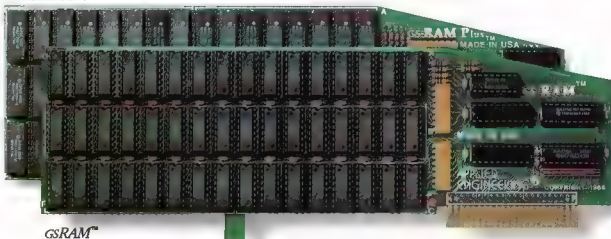
Open—and Read—Case

Thank you for your response to my letter ("TEXT and ASCII," Apple Clinic, February 1987, p. 22). I've found that, contrary to your suggestion, ProDOS can very simply open files stored with virtually any type of parameter. Just add the Type parameter to the end of the OPEN command (BASIC Programming with ProDOS, Appendix A).

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Table. Printing foreign-language fonts with the ImageWriter I and II. (Information obtained with permission of Apple Computer from ImageWriter User's Manual: Part 1: Reference, pp. 43-44, and ImageWriter II Owner's Manual, pp. 75 and 86.)

Language	Font	Control Codes	DIP Switches			ImageWriter Model
			1-1	1-2	1-3	
American	# 9 [\] ' () ~	Esc-Z Ctrl-G Ctrl-@ Esc-Z Ctrl-E Ctrl-@ Esc-D Ctrl-B Ctrl-@	open open	open closed	open open	I and II I
British	£ ¢ [\] ' () ~	Esc-Z Ctrl-D Ctrl-@ Esc-D Ctrl-C Ctrl-@	closed	closed	open	I and II
German	# S A B U ~ ä ö ü ß	Esc-Z Ctrl-C Ctrl-@ Esc-D Ctrl-D Ctrl-@	open	open	closed	I and II
French	£ ¢ ' ¢ S ' é ü ~	Esc-Z Ctrl-A Ctrl-@ Esc-D Ctrl-F Ctrl-@	open	closed	closed	I and II
Swedish	# S A B A ~ ä ö Å ~	Esc-Z Ctrl-B Ctrl-@ Esc-D Ctrl-E Ctrl-@	closed	open	closed	I and II
Italian	£ ¢ ' ¢ é ü à ö è ì	Esc-Z Ctrl-F Ctrl-@ Esc-D Ctrl-A Ctrl-@	closed	open	open	I and II
Spanish	£ ¢ ; Ñ ¿ ~ ñ ¢ ~	Esc-D Ctrl-G Ctrl-@	closed	closed	closed	I and II
Danish	# S A B A ~ æ ö Å ~	Esc-Z Ctrl-E Ctrl-@ Esc-D Ctrl-B Ctrl-B Ctrl-@	open	closed	open	II

For example,
100 PRINT CHR\$(4); "OPEN";
Filename;"T\$00"

opens PFS:File "ASCII" text files, stored with file type \$00, which caused me so much frustration. You can use any three-character file type, including DIR.

This solved my immediate problem, but did little to relieve my disgust with PFS and Software Publishing. I purchased PFS:File under the impression, given to me by the manual, that the program outputs ASCII text files. It doesn't. A "text" file that only other PFS products can read without modification is hardly useful. If software must use proprietary file types, it should be because the format isn't standard, such as AppleWorks' or WordPerfect's, not for marketing purposes.

Todd Koetje
Knoxville, TN

Thanks for the additional information. I looked up the Type command myself, at the chapter and verse you cite, when I originally tried to answer your question. But I just couldn't open and read AppleWorks files from ProDOS. As you point out correctly, OPENing a file is one thing—doing something with it is quite another.

I think a good program that opens, reads, and displays any type of ProDOS file would be of real value to inCider readers—anybody have one?

Who Needs Extra RAM?

I have an Apple IIe and a DuoDisk drive. I run small-business applications typically involving one or two program disks and one or two data disks

each. I recently bought a TransWarp accelerator card, which delivers extra speed as promised. But of course it doesn't speed file loading or saving.

How much extra RAM would it take to load into memory three full 5¼-inch floppy disks? Is there a simple way to change a startup program to recognize that all the files it needs are in ROM? How can I adapt the program to write all the files back to disk from ROM when I'm finished?

I'm reluctant to go to a hard-disk drive unless absolutely necessary.

Wilbur Skeels
Thousand Oaks, CA

RAM disks cause a lot of confusion. It's pretty easy to figure how much RAM you need to hold the data from a number of floppies—each floppy contains 143K. You'd need a RAM disk of at least 429K—it would probably be 512K.

If you want your programs in RAM, you could copy them into RAM with the ProDOS Filer, System Utilities, or some other copy program. You could also write a program that would put them there, but it wouldn't be simple BASIC. I'd recommend that, if you want to keep a program or two in RAM, you buy Alan Bird's Better BYE, which is a patched version of ProDOS that recognizes RAM. Bird's Better BYE is available on all products from The Software Touch (9625 Black Mountain Road, Suite 204, San Diego, CA 92126, 619-549-3091).

As to using your extra memory as a RAM disk, it couldn't be easier. If you have an Apple-style memory card, one that fits into a peripheral slot, the volume name of your RAM is

/RAM1, /RAM2, or whatever, depending on the slot in which it's installed. If your memory card is an Applied Engineering RamWorks type that plugs into the expansion (auxiliary) slot, the volume name is just /RAM. Use that pathname to save files in ProDOS.

RAM expansion works best with ProDOS. I say that deliberately, hoping some irate reader sends me nifty details about how he or she uses a RamWorks card with DOS 3.3.

Foreign Intrigue

How can those of us with an Apple IIe and an ImageWriter I write and print in foreign languages?

Sally McMahon
Rochester, NY

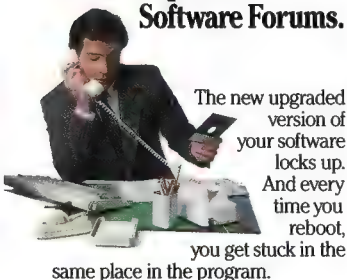
The trick's in these ten symbols: # @ [\] ' { } ~. You can make them print the various foreign characters you need. What's on screen won't look like much, but what goes to the printer will be very Continental.

There are two ways to switch characters: through software and through hardware. The software switch is simplest if you have AppleWorks or some other program that lets you send control characters directly to the printer.

The hardware fix isn't too difficult, either, and it's relatively permanent. Just open the ImageWriter and play with DIP Switch Assembly 1 (SW1). Don't be frightened by that—it's just a group of three switches right inside your ImageWriter that you can set yourself. (See the accompanying Table for control codes and switch settings.) Control codes in text override your DIP-switch settings. ■

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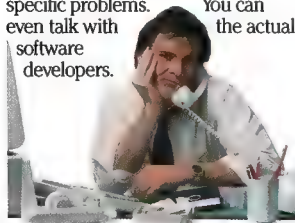
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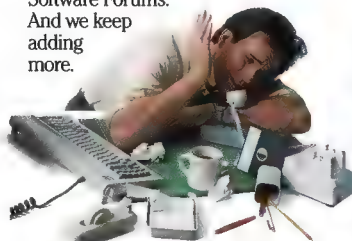
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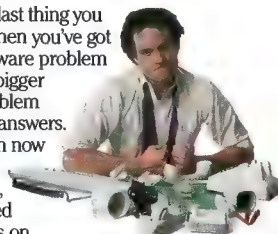
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MS-DOS: Looking Both Ways

by Eric Grevstad, Review Editor



"When all is said and done, I see only one and a half reasons for Apple owners to add MS-DOS."

There's confusion in the marketplace; Applied Engineering has introduced an MS-DOS processor for Apples; Orange Micro has decided not to introduce one; readers are asking advice; and someone has denounced me on the *inCider* BBS as "non-Apple-minded." It's time I rolled up my sleeves and stepped to the chalkboard—time for a straight talk from a guy who's seen both sides of the fence. Yes, I've owned other systems and written for other magazines. No, I don't think MS-DOS options will have a big impact on the Apple world.

Let me say first that I'm not knocking the Applied Engineering board; it looks like a technical wonder, and I'm looking forward to trying one. But, generally speaking, MS-DOS for Apple (whether the II or an open Mac) is a defensive move, a step dictated by marketing considerations, like "Reads AppleWorks Files" on a software package or the phrase "artificial intelligence" in an ad. Instead of the usual Apple stance of evangelism—educating buyers about benefits with "This is great and you should have it"—it's a resigned "Well, if you want this, we can get it."

And, once you get it, what do you do with it? Looking at the matter of MS-DOS from an Apple II viewpoint, I'd argue that perhaps the most frequently mentioned advantage is a delusion: Being able to run IBM software may be no big deal. It goes against the independent Apple owner's spirit to join the zombies chanting, "I want Lotus 1-2-3." I tell PC owners there are cheaper, more convenient spreadsheets that read and write Lotus files; I tell Apple owners they can do better with SuperCalc3a or VIP Professional, a memory card, and a TransWarp. (The latter two will boost their other programs, as well.)

The Apple II library is still ahead of the PC's in education and entertainment, and led in graphics and sound even before the IIgs. As for business applications, the kinds of high-powered programs that tempt people to PCs tend to be the ones like Framework II or Javelin that work best with 640K, a hard disk, and the extra speed of an AT. The simpler floppy-disk-based programs

more likely to be used with coprocessors are often comparable to ProDOS titles. AppleWorks is one heck of a program, 8 bits or no.

In ease of use, Apple is superior. It's not just new programs with mice and pull-down menus; it's the convenience of program disks that boot themselves and a DOS that's invisible to casual users. (Do you look forward to typing *copy c:\wordpro\review.1* *tr /v* on a coprocessor?) Someone buying an MS-DOS system or software has to deal with five incompatible video modes or standards. Some Apple owners don't know how lucky they are.

Among other factors, I don't think MS-DOS compatibility will be an issue—I know Rana Systems tried and failed with a coprocessor, but that was before you could buy PC-compatible ROM chips in convenience stores. There may be minor compromises, though, in getting IBM-type disk drives and adjusting to different keyboard layouts (Open apple-1 for the F1 key or whatever). A IIgs with an MS-DOS board may be the best of three worlds, but it may also be like a sports car with a convertible, hardtop, and T-top; there's some swapping, latching, and unzipping to do.

A more important point will be cost—the price of a coprocessor and disk drives compared to that of a separate PC clone (and clone prices are falling through the floor while new Apple prices remain on a pedestal). Ultimately, as odd as it sounds, the critical factor may be desk space—your Apple plus a coprocessor won't take up as much room as your Apple plus a PC clone.

When all is said and done, I see only one and a half reasons for Apple owners to add MS-DOS. The half is the sneaky, whispered argument used by clone salespeople in the educational market, playing on parents' fears of sending their children ill-equipped into a PC-dominated business world. Apple vigorously denies that theory and insists it's heard no word of such concerns from its school customers. The main reason for MS-DOS is a definite convenience, albeit for an unmeasured audience—if you work in a PC-equipped office, it's going to be nice to take work home to your Apple. Past that, I'm reserving judgment. ■

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REVIEWS

On Balance 1.0; Clan Practical Accountant;
MouseWrite 2.6; Brother M-1109AP;
The Beagle Compiler, Micol BASIC 2.0, ZBASIC

Flexible Finances

ON BALANCE 1.0

Broderbund Software Inc., 17 Paul Drive,
San Rafael, CA 94903, (415) 479-1700

Home-budget program; 128K IIC, enhanced
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\$99.95

Rating: ■■■■■

Even if you think love makes the world go 'round, the song from *Cabaret*—"Money makes the world go around"—has a point. There are a lot of programs that can help you keep family finances from going into a tailspin (see "Making the Right Moves," January 1987, p. 42), but On Balance is one of the best yet.

Unlike some products that do too little and others that try to do too much, Broderbund's finance manager is focused. The program concentrates on the person who wants more than a checkbook balancer, but less than a full-blown investment counselor.

On Balance has a Macintosh-like interface with pull-down menus and mouse control, though using the keyboard seemed more natural to me. Selecting menu items with the keyboard goes smoothly, while other commands are either identical to AppleWorks functions (Open apple-H for screen printing) or otherwise easy to learn (Open apple-Delete to remove an incorrectly entered transaction).

On Balance's menu titles underscore the program's ease. The Accounts menu reveals logical choices such as Add/Edit, Merge Two Accounts Together, Reconciliation, Budget, or Last Year to This Year. The same logical association of commands is apparent in the Transactions, Reports, File, and Customize menus.

The Goodies menu offers an array of options including a pop-up calculator and a notepad. The List Accounts and List Groups features, which you might expect to find in the Accounts menu, are found here instead.

The Customize menu understates its own importance. Unlike most configuration menus, this one doesn't just let you install your printer—it lets you tailor the program's appearance as well.



The default screen shows dark print on a light background; if you find that difficult to read, try light on dark instead.

You can even change the appearance of screen formats to show only the information you require, such as a full memo associated with an account (listing, say, a client's address and any other information you like) instead of an abbreviated memo with only a name.

FREE-FORM CONTROL

Such flexibility is where On Balance really shines. With some finance programs, you have to be totally organized before you boot up. You have to know what accounts you need; in some cases, you have to know what numbers to use with each account so that the program will be prepared to handle income, assets, liabilities, credit cards, and expenses.

On Balance is the most forgiving home-finance program I've used. Oops—wrong account name? No

problem. Forget an account? No problem either. You have complete control over editing and correcting information at nearly any point in the program, even changing an account's type (from an expense account to an income account, for example) after creating it.

Program capabilities are flexible, too. On Balance can handle up to 800 transactions per month or a maximum of 200 accounts. Accounts can be pooled into as many as 23 different groups. A condominium owner, for instance, might manage his or her investment with a group called

inCider's Ratings

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Very good—impressive and recommended
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Fair—flawed but adequate
Poor—unacceptable or unusable



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by Alan Bird

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AutoWorks automates AppleWorks by adding time-saving features such as Mail Merge, File Organizing, Macros, new AppleWorks Commands and Mouse Control.

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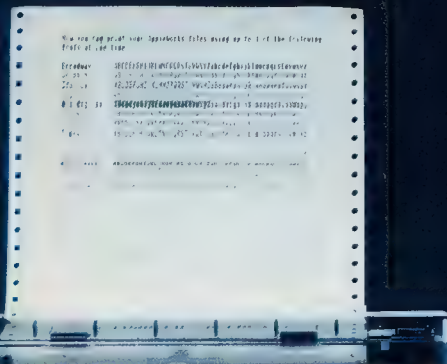
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"Condo," keeping track of assets (the condo itself, money in the checking account), liabilities (a mortgage), income (rents), and expenses (fees, utilities, taxes).

Account names are a generous ten characters long. You may still have to abbreviate some names (CONDO.UTIL), but each account's memo can easily spell things out. You can print a list of accounts at any time. An option in the Customize menu keeps you informed about the number of accounts, groups, and transactions you have and the amount of room remaining.

SOPHISTICATED STUFF

You don't have to use On Balance as a double-entry bookkeeping system, but it seems more accurate to do so. You won't find the words "debit" and "credit" in the On Balance manual, but you'll see clear examples for entering common transactions—such as the federal income taxes withheld from your pay, a dinner charged to your credit card, and commissions paid to your broker. You

need to know only the two accounts (such as Checking and Broker) involved in the transaction. The program handles the debiting and crediting for you.

A single floppy disk holds a year's worth of financial data. Are you treasurer of a club? Do you run a small business from your home? Format separate data disks for these organizations. If security is important, you can add password protection.

Among other standard features, On Balance can print net-worth and income/expense statements. You can split transactions and ask the program to remind you to pay recurring transactions, or flag tax-deductible expenses and as many as three other kinds of items to monitor closely. On Balance will even print checks for you (compatible continuous-form checks are available from New England Business Service for about \$42 per 500).

On Balance is fast. The program handles one month's affairs at the same time, so all information in the June database is in memory at once.

This makes for nearly instantaneous searches and recalculations, with data-disk access required only when the program needs to find information spread across multiple months. For any account, you have to type in only enough characters for On Balance to distinguish it from others; On Balance finishes typing for you, speeding up the process even more.

Owners of single-drive systems will appreciate that, once loaded into memory, On Balance needs its program disk only for fairly infrequent tasks such as customizing or printing. I was disappointed that the original version I tested didn't support the UniDisk 3.5 as a second drive, though a company spokesman assured me that a version released in February fully supports 3½-inch disks as both program and data drives.

Indeed, after an initial flurry of negative comments, Broderbund adapted to the different demands of productivity-application users (as opposed to its usual game and educational audience): It removed the program's copy protection and announced that On Balance packages would include both 3½- and 5¼-inch disks. Anyone who has ever trashed a disk knows how crucial it is to have a backup at the ready—especially for a program that manages your checkbook. Broderbund's change of policy is a commendable customer service.

THE BOTTOM LINE

On Balance doesn't offer any of the extras associated with investment—no real-estate analysis, stock-portfolio management, amortization schedules, or tax forecasting. It can, however, get you started with more sophisticated analysis. An Export to AppleWorks utility lets you create an AppleWorks spreadsheet template with special codes that tell On Balance where to put desired information. Then you can crunch numbers any way you please.

But if you don't need advanced investment guidance, On Balance is focused, flexible, fast, and easy. It's a first-class choice for the most important personal financial chores: budgeting, checkbook management, and income-tax organization. ■

Cynthia E. Field
Wakefield, RI

Computer Talk



The Echo IIB speech synthesizer is compatible with the Apple® IIe, II + and the new Apple IIGS. It offers both text-to-speech and natural sounding speech capabilities. Its unique text-to-speech program gives the Apple an unlimited vocabulary. The Echo IIB also features distinctive natural sounding speech in a female voice. This fixed vocabulary of 720

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Check It Out

CLAN PRACTICAL ACCOUNTANT

Sir-Tech Software Inc., P.O. Box 245,
Ogdensburg, NY 13669, (315) 393-6633

Bookkeeping and check-tracking program;
48K Apple II Plus or later
\$79.95

Rating: ■■■■

It's a little difficult to put the Clan Practical Accountant (CPA) into a software category. It isn't really a planning tool like MECA's Managing Your Money, which compares budgeted amounts to dollars actually spent. It won't write your checks like Intuit's Quickcheck, nor create balance sheets like Peachtree's Back to Basics. Rather, CPA is something of a super checkbook balancer—it focuses on tracking the income you or your small business collects along with the money you spend, and breaks all of the details into as many classifications as you need.

What's probably most fascinating about CPA is that it comes from game manufacturer Sir-Tech, and you can see the breeding in the program: It's really fast. CPA is also intelligent and well-designed; while it works with menus, you can access any part of the program with just a keystroke or two. It even comes with a wall chart that shows each screen with its command codes, so you can go anywhere you wish almost instantly.

A SENSIBLE STRUCTURE

The basic program has four main areas. The setup module lets you enter your chart of accounts, so you can distribute your income and expenses. For business costs, you might have accounts for purchases, sales tax, trucking expenses, and so on. You can also departmentalize each account, so if your business operates in more than one area, you can tell each area's income, expenses, and so on at a glance.

In a home application, you may receive income from several sources—creating, for example, an account for your salary and another for dividends. You can ask for subtotals for various account areas, so you can quickly see how much you're spending for each group of accounts.

In the second step, you enter transactions—distributing income and expense amounts on a screen that's smart enough to guess, most of the time, where the amounts should go. Often just entering a few letters that describe the account (like *Car E* for Car Expense) lets CPA figure out what you mean and complete the entry for you.

The package can also handle automatic transactions. If you get the same salary every pay period, or bills of the same amount each month (such as your home mortgage), list them as automatic transactions and CPA will enter them for you at the start of each month. I thought I'd try to trick CPA a little and gave it a date three months later than the last time I'd posted my information. The program asked whether I wanted to post the automatic transactions; when I said yes, it went through them for each of the months I'd skipped.

CPA is smart here, too, allowing automatic payments or income entries not only in the increments you'd expect—monthly and quarterly—but twice a month and biweekly, as well. As anyone who pays bills in either of those formats knows, twice a month is not the same as biweekly.

Once you've got data into CPA, its third section provides an excellent check-reconciliation sequence that's not only easy, but fun at the same time. Checks appear on your screen in monthly increments, listing those that have cleared or not, as you wish. You can always find out what cash you should have in any of your accounts.

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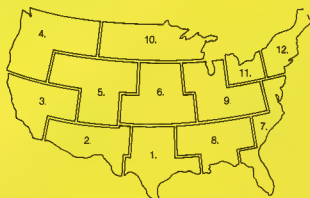
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The last part of CPA gives you access to various utilities for jobs like making a data disk or setting up your printer. One interesting note: the program can work in either 40- or 80-column mode, and will automatically use an 80-column card if you have one. The 40-column display is a bit cumbersome, as you must type Control-A to flip between halves of your screen.

PROS AND CONS

CPA doesn't have everything on my software wish list. For instance, I think any financial program today should provide a link to AppleWorks so that users can play "what if" games with their spreadsheets. It would be nice to see CPA write checks as well as track them, and provide some graphics to help you see where your dollars are being spent. For the sake of fitting into the business world better, I also wish Clan Practical Accountant could provide a balance sheet listing assets and liabilities. (To CPA, a balance sheet is the printout you get

when you balance your checking accounts.)

Still, the program's ease of use makes up for many shortcomings. I haven't written about CPA's documentation until now—because Sir-Tech suggests you don't read it. Oh, the package has everything from a beginner's guide to accounting to a brief tutorial and larger reference booklet, but most of it isn't really necessary. This is one of the few programs with which you can genuinely just copy the sample disk and start working, rather than laboring over the manuals. Once you have a basic grasp of what the program does, you'll have to check the manuals only when you have a question or problem.

CPA has its limits—after all, it's basically a system to track your income and the expenses you pay by check—but it does what it's designed to do, with many thoughtful touches. Most entries are single keystrokes without pressing the Return key, so moving around is very fast. While the pro-

gram disk isn't copyable, Sir-Tech provides a backup in the package. To help get you started, there's practice information with a sample chart of accounts to use and change as you see fit. The package even includes labels for your data disks. ■

Gregory R. Glau
Prescott, AZ



Good Words, Great Processing

MOUSEWRITE 2.6

Roger Wagner Publishing Inc., P.O. Box 582, Santee, CA 92071, (619) 562-3670
Mouse-based word processor with mail merge, spelling checker, and communications; 128K Apple IIc, enhanced IIe, IIx; RAM card optional
\$149.95
Rating: ■■■■■

In July 1985, *inCider's* Editors' Choice page acclaimed MouseWrite as the herald of a new era in Apple II software; a few months later, the concept was still fresh enough for a reviewer to spend his article on the pros and cons of mouse versus keyboard word deletions. Times have changed. Mouse control and pull-down menus aren't novel anymore, and Roger Wagner Publishing's word processor has grown from a "Look, Ma, point and click!" program to a feature-rich integrated package.

MouseWrite's main appeal remains its easy Macintosh-like interface, but the latest version adds everything from a spelling checker and color printing to simple telecommunications. It's still not a superpowered program; a conservative, keyboard-oriented word-processing buff might rate MouseWrite between average and good. But a

Continued on p. 88

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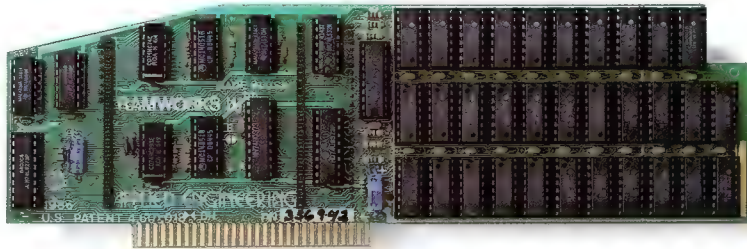
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A+ magazine said "Applied Engineering's RamWorks is a boon to those who must use large files with AppleWorks...I like the product so much that I am buying one for my own system." InCider magazine said "RamWorks is the most



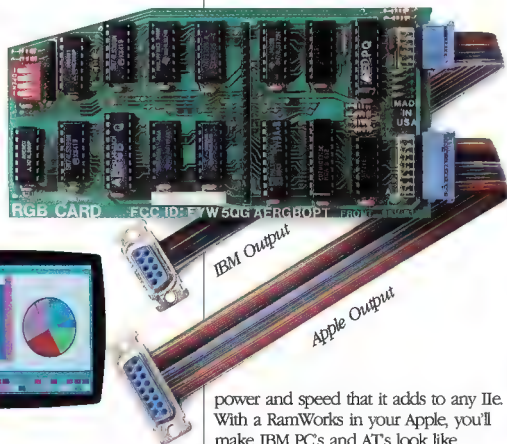
Steve Wozniak, the creator of Apple Computer

"I wanted a memory card for my Apple that was fast, easy to use, and very compatible; so I bought RamWorks."

powerful auxiliary slot memory card available for your IIe, and I rate it four stars...For my money, Applied Engineering's RamWorks is king of the hill."

Apple experts everywhere are impressed by RamWorks's expandability, versatility, ease of use, and the sheer

RGB Option



ference and remember you can order the RGB option with your RamWorks or add it on at a later date.

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power and speed that it adds to any IIe. With a RamWorks in your Apple, you'll make IBM PCs and AT's look like slowpokes.

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RamWorks III is from Applied Engineering, the largest, most well supported manufacturer of Apple peripherals and the inventor of large RAM cards for the Apple. With our 5 year no hassle warranty and outstanding technical support, you're assured of the most trouble free product you can buy.

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THE DESIGNING APPLE

*Whether you're rearranging your living
room or designing circuit boards,
there's an affordable computer-aided
design package for you.*

by Lindsay Yarnall McGrath

Computer-aided design (CAD) is taking on new dimensions. Once available only to large corporate users for specialized applications, CAD software is now inexpensive and easy to use at home and in small businesses. Currently on the market are several CAD products that let you do everything from planting a garden to designing a building with your Apple II computer. Casual and serious users alike are adding these products to their software libraries. Whether you're a landscaper, an architect, or a CAD newcomer with a dream house you want to build, there's a program to meet your design needs and your level of expertise.

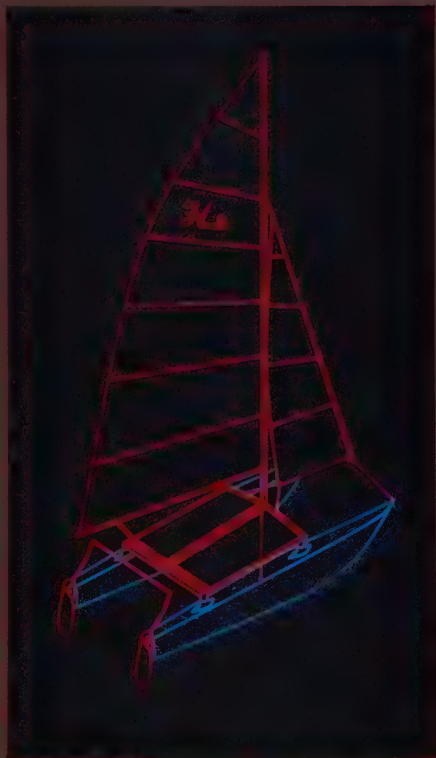
HOME IS WHERE THE CAD IS

While many low-cost packages are bringing CAD into small businesses, computer-aided design isn't limited to professional computer users. From designing quilts to landscaping your front lawn, many Apple enthusiasts use CAD programs at home to manage tasks that would have taken hours with pencil and paper or, in some cases, required an outside consultant—a contractor, landscaper, or interior designer.

• **The Design Your Own Home Series**, from Abracadata, is aimed at major home-planning jobs. The series' three programs—interior, landscape, and architecture packages—run on any Apple II computer (including the GS) with 48K, one or two disk drives, and mouse, paddles, graphics pad, or joystick.

John Grattan, a business executive and real-estate investor from Long Island, New York, bought Abracadata's architectural program to design a roof for his vacation cabin. In addition, his daughter, who wants to be an architect, is using the program for school projects; she also plans to use it to put together a design portfolio when she applies to college. Grattan has an Apple IIe with 128K of memory and an Epson MX-100 dot-matrix printer.

With his roof securely in place and his daughter learning more about her chosen profession, Grattan says he's ready to pursue his next CAD project: enhancing the grounds around his home and the two rental properties he owns with Abracadata's landscape-design module. Using his Apple to work out planting schemes will be some-



The designs at right were created with Versacad's Cadapple Entry Level.

FOR FUN

*creative Apple II users
can design everything from
sailboats to quilts.*



FOR HOME

you can design your future dream house, or make your current home a little more dream-like.



FOR BUSINESS

planners can plot the growth of a neighborhood.



Abracadada's Design Your Own Home Series is a CAD trilogy: You can design additions to your house with the Architecture package, arrange rooms with the Interiors program, and tidy up the yard with the Landscape program.

thing new for Grattan; instead of consulting a landscaper, he says he'll try out several designs on screen.

With the landscape program, Grattan will be able to change the scale of a variety of shrubs and trees, and the size of his on-screen foliage to see how the young plants will appear when they mature.

Once he's decided on a layout, Grattan says, he'll buy the plants and have a landscaper execute his plan. He says he expects the program to save him a lot of money. "Otherwise, I'd be paying for consultation services," he explains, adding that his landscaper works out plans by hand. "I'm looking to do the same thing the cheap way."

Besides complicated tasks such as construction and landscaping, CAD lends itself to simple home-design tasks. When Jeffrey Young and Judy Glass moved into a new apartment, for instance, they used Abracadada's interior-design program to try out different furniture arrangements—without any heavy lifting. The Whitestone, New York, couple also produced floor plans for their own analysis and showed them to salespeople when visiting furniture stores.

The program features a variety of furnishings—from beds, chairs, and light fixtures to microwave ovens—you can rearrange on screen. You can add color to furniture and rooms, and call on a special patterning capability to simulate wallpaper. "It's really a glorified sketchpad," says Young, who has both an Apple IIc and a IIgs at home. "We'll use it again if we need more things or if we move into another apartment."

Home Architect, from MicroSparc, is also ideal for home CAD applications: It helps you lay out floor plans and do other simple structural-design tasks. MicroSparc also markets **Designer/Illustrator**, for garden and landscape design as well as plumbing and circuit design.

These programs work on any kind of Apple II computer (including the GS) with 48K of memory. They don't contain printer routines, though; if you want to produce hard-copy designs, you'll have to buy a separate screen-dump card, such as ThirdWare's FingerPrint+, or a printing utility such as Polarware's Graphics Magician. (Adding printing software requires tailoring your design program's code to work with the utility, though.) The only input device you can use is the keyboard; these programs don't support mice, game paddles, joysticks, or other peripherals.

When you've landscaped your yard and set up your rooms the way you want them, there's still another type of low-end CAD program that may interest you. If quilting's your hobby, **Patchworks**, from Random House Software, can turn you into an expert designer in about an hour.

fabrics and supplies, making and using templates, piecing together the elements of the quilt top, trying different stitches, and more.

Like CAD programs for more advanced applications, Patchworks saves hours of design work, math, and perhaps disappointment with a finished product that looks nothing like the one you'd hoped for. Patchworks works on any Apple II with 48K and one or two disk drives. It costs \$49.95.

AN APPLE IN THE OFFICE

David Banks, an architect in Kentfort, Kentucky, uses Versacad's **Cadapple Entry Level** on his Apple IIc system to keep plans up to date.

"In our business, drawings get changed all the time," explains Banks, who specializes in architectural work for colleges and universities, hospitals, and clients who need to remove asbestos from buildings.

Banks says he uses Cadapple Entry Level to simplify revision of drawings. With 128K of memory in his IIc, an external disk drive, ImageWriter printer, and Apple Color Plotter, Banks details small sections of larger architectural drawings—such as a corner of a structure or the area where a wall joins the floor.

When some particular has to be changed—a common occurrence during a building's planning phase—Banks creates a new sketch on his Apple IIc and prints it on the plotter. Using a plain-paper copier, he then transfers the image to clear acetate and superimposes it on the larger architectural drawing. From that plan, blueprints are produced.

Versacad's Cadapple Entry Level is basically a scaled-down version of the company's \$1500 **Cadapple** program. Entry Level provides seven on-screen objects, from lines to ellipses, and lets you add text to designs. It offers automatic dimensioning and a zoom function, and lets you create ten-layer drawings. Cadapple Entry Level runs on the entire range of Apple II computers, including the GS, with 64K of memory and two disk drives.

Software like Cadapple Entry Level gives you capabilities that could once be found only in much more expensive packages. "To buy advanced [CAD] software could cost \$20,000. I think I got a couple thousand dollars worth of software [in Cadapple Entry Level]. I'm very happy with the software," says Dennis Eister, a structural engineer in Salt Lake City, Utah, who bought Cadapple Entry Level to educate himself at home about computer-aided design on his Apple IIc system.

Product Information

Cadapple, \$1495
Cadapple Entry Level, \$99
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 92647
 (714) 847-9960

Reader Service Number 300

Caddraw, \$65.50
Discovercad, \$239.95
 Hearlthy & Co.
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 Springfield, OH 45501
 (513) 324-5721

Reader Service Number 301

CAD 1+, \$695
CAD 2, \$1320
 Robo Systems
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 Suite 150W
 Langhorne, PA 19047
 (215) 750-6990

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 Pembroke, MA 02359
 (617) 826-0095
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Reader Service Number 303

Designer/Illustrator
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 Concord, MA 01742
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 \$29.95 each

Reader Service Number 304

Design Your Own Home
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Landscape
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 Eugene, OR 97402
 (503) 342-3030
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Reader Service Number 305

FingerPrint+
 ThirdWare Computer
 Products
 4747 N.W. 72nd Avenue
 Miami, FL 33166
 (305) 592-7522
 \$149

Reader Service Number 306

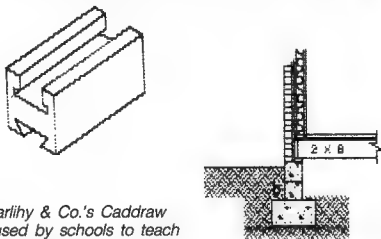
Graphics Magician
 Polarware
 P.O. Box 311
 Geneva, IL 60134
 (312) 232-1984
 \$39.95

Reader Service Number 307

Patchworks
 Random House Software
 201 East 50th Street
 New York, NY 10022
 (212) 872-8041
 \$59.95

Reader Service Number 308

Discovercad and **Caddraw**, from Hearlthy & Co. of Springfield, Ohio, are two other popular packages for Apple computers. Caddraw, introduced in 1984, is now used in more than 1900 schools to teach computer-aided design, according to the company. The program lets you create real-scale drawings up to 12 by 16 inches in size and offers freehand sketching capability as well. In addition, the software contains a shape library of more than 500 architectural, standard drawing, electronic, landscape, and furniture symbols. Caddraw works on Apple II Plus, IIe, and IIc computers, and is being revised for the GS.



Hearlthy & Co.'s Caddraw is used by schools to teach the fundamentals of computer-aided design.

Discovercad, introduced in 1986, is billed by its manufacturer as a true "turnkey" system, with options for text input and automatic dimensioning. It also lets you make 128-layer drawings. The program's user interface is similar to that of the Apple Macintosh, with pull-down menus and mouse input.

This software has been an invaluable tool at McCoy Avionics Corporation of Columbus, Ohio, where J. Phil McCoy and his four employees design and manufacture control-display devices for aircraft radios. "The interface shortens the learning curve," says McCoy. "Within the first half day I was ready to do valuable drawings."

McCoy adds that he uses Discovercad for two broad applications—marketing communications and mechanical design. He produces diagrams and schematics to illustrate his products' installation manuals and to design product

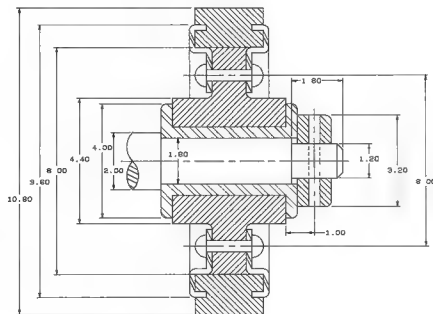
parts. When he's completed the mechanical design of the boards with Discovercad, McCoy explains, he sends the information to an East Coast company, which completes the boards' circuit design on a mainframe computer.

Using Discovercad has saved money and time, says McCoy, whose Apple IIe has 128K of memory, dual drives, and a mouse. McCoy produces hardcopy with an ImageWriter dot-matrix printer. "Before we got the program, we used conventional drafting. If you moved one component on a circuit board, you'd have to do the whole drawing all over again," he says, adding that manual redrawings took up to 1½ days. "Now I can just edit, as I would with a word processor."

DESIGNING YOUR CAD SYSTEM

One of the best things about Apple II CAD is the low cost of a functional system. All packages mentioned here, for instance, are priced between \$29.95 and \$239.95.

Discovercad is a higher-end, but still affordable, CAD system that combines sophisticated features with an easy-to-use interface.



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832k MultiRam	244. ...	212. ...
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And you won't need a lot of new equipment: None of the low-end programs included in this article requires a special add-in graphics board. Some users add extra memory to their systems to increase processing speed for CAD applications, though; others invest in more sophisticated printers or plotters. For other users, a color monitor is important, especially for a program such as Abracadata's Interiors module.

Other companies offer similar programs for different levels of experience. Hearlhy's Caddraw system carries a list price of \$65.50, for instance, but to get the most out of the program, which doesn't include print-dump routines, you'll probably need to purchase a separate printer utility or screen-dump card. Hearlhy also offers a complete Caddraw system, including the extra software for dot-matrix output and CAD-symbol creation, for \$149. The company's Discovercard product comes complete with printing and plotting capabilities for \$239.95.

Versacad's Cadapple Entry Level works only with the Apple Color Plotter (a discontinued product) and Hewlett-Packard and Houston Instruments plotters. Although some users may consider that a drawback, the package offers other benefits; for example, Versacad will credit 50 percent of the purchase price of its entry-level system toward the cost of Cadapple, its high-end product, if you upgrade. CAD files created with Entry Level are compatible with Cadapple.

Another program designed for higher-end applications is **Designer 3D**, from Kern International Inc. of Pembroke, Massachusetts, a software publisher specializing in scientific and educational programs. Designer 3D costs \$120 and features three-dimensional graphics.

Apple II CAD products offer a variety of features, from output options to provision of upgrades, you'll want to explore before you make a purchasing decision. If you're unsure about the type of CAD software you need, ask manufacturers for product literature. Some also provide demonstration versions of their software. Hearlhy & Co., for example, offers an interactive Discovercard demonstration disk for \$19.95.

DESIGNING THE FUTURE

As software publishers begin to exploit the power of the IIGs, the number of CAD programs on the market and their capabilities will expand. Although Abracadata's three-program series currently runs on the GS, the company says it will publish a special GS version of the series this fall. A number of other companies say that after watching the marketplace for a while, they'll probably hatch ideas for GS products themselves.

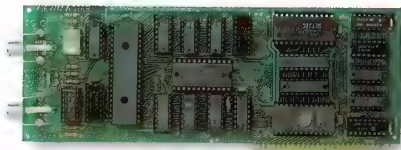
If you're content with your IIC or IIE, though, and don't plan to upgrade to a GS, myriad products can bring you the power of CAD at affordable prices. The time it takes to evaluate available programs and learn about CAD is well worth it. Whether you're looking for an educational tool for your children, a CAD package for your small business, or one that will give you the experience to move up to a high-end system such as Versacad's Cadapple or **Cad 2**, from Robo Systems, the products are available.

Low-end packages in particular give you a chance to get the whole CAD picture without spending a lot of money. The software is effective, yet easy to use. Says architect Banks of his experience with Cadapple Entry Level, "My 16-year-old son picked it up and learned it even before I did." ■

Lindsay Yarnall McGrath is a free-lance writer whose work has appeared in InfoWorld, Micro Marketworld, and a variety of other computer and general-interest publications. Write to her at 725 Main Street, Half Moon Bay, CA 94019.

Viewmaster 80

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VIEWMASTER 80	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SUPRTERM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WIZARD 80	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VISION 80	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OMNIVISION	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VIEWMAX 80	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SMARTER	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VIDEOTERM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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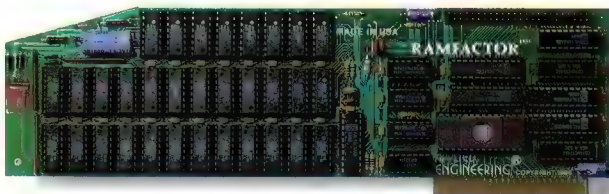
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There are other slot 1-7 cards that give AppleWorks a larger desktop, but that's the end of their story. But RamFactor is the only slot 1-7 card that increases AppleWorks internal memory limits, increasing the maximum number of records in the database and lines permitted in the word processor, and RamFactor is the only standard slot card that will automatically load all of AppleWorks into RAM dramatically increasing speed and eliminating the time required to access the program disk, it will even display the time and date on the AppleWorks screen with any ProDos clock. RamFactor will automatically segment large files so they can be saved on 5¼", 3½", or hard disks. All this performance is available to anyone with an

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PUMPING UP THE IIe

Need more speed and power from your computer? Memory expansion, mass storage, or microprocessor acceleration could be the answer. Here's a primer on beefing up that old (or new) Apple IIe.

by Paul Statt, *inCider* Technical Editor

You've spent hundreds of dollars on software, and your computer still won't do what you want. Maybe software isn't the problem. Your programs may be able to do the job, but not quickly or easily enough. If that's the case, your software needs some help.

Your Apple II can become a more powerful machine with the help of expansion hardware and a little knowledge. You don't have to be a programmer to build a "power IIe," but it helps to know enough about your machine to be able to write short utilities and tinker with the code without fear.

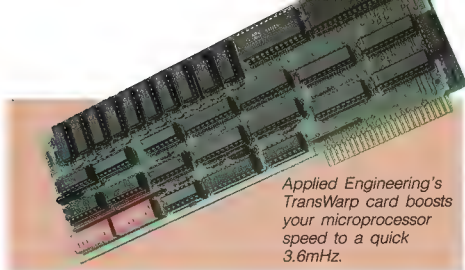
One way to perk up your Apple IIe's performance is by making the machine run faster. You can speed up program execution with an *accelerator card*; you can get data into your Apple faster with a *mass-storage device*. And you can pick up a little of both—program speed and data speed—with a *memory-expansion board*.

THE HEART OF YOUR APPLE

Of these three types of accessories, accelerator cards are the simplest to understand. Your plain-Jane Apple IIe uses a 6502 microprocessor, your Apple IIc a 65C02. Each reads and carries out a million instructions per second. (The clock speed is 1 megahertz, to use the right term.) Sounds pretty fast, until you realize how painfully simple each instruction is, and that newer microprocessors—such as the Apple IIgs' 65816 at 4 megahertz, or the Intel 80386 at 16 megahertz—move a lot faster.







Applied Engineering's TransWarp card boosts your microprocessor speed to a quick 3.6MHz.

A card such as Applied Engineering's **TransWarp** or the Titan **Accelerator IIe** (see Reviews, December 1986, p. 148, for a comparison evaluation) breaks the speed limit by putting a faster 65C02 into your IIe, one that executes instructions at 3.6 megahertz. In theory, your Apple should work 3.6 times faster—but in practice it doesn't quite match that.

You just can't speed up certain important links in the chain of commands that make your computer function. The most important one is the speed of your disk drives. The original Apple II was designed to store data on cassette tape: You must add a card to your IIe to use a 5 $\frac{1}{4}$ -inch drive, UniDisk 3.5, or hard-disk drive. The chips on those cards work only with a 6502 running at 1 megahertz, so your accelerator has to slow down to let the disk drives catch up.

The problem is most obvious in the disk-drive department, but it's a bottleneck wherever the microprocessor resorts to getting information from the outside world or reporting to it—that includes the keyboard and the video monitor. Given those constraints, it's amazing that accelerators speed up your Apple as much as they do.

Some programs, especially games and telecommunications software, depend on the 6502's 1-megahertz speed for timing. Those telecommunications packages won't work with an accelerator; although the games will run, they'll go at such breakneck speed that you won't be able to keep up with the action.

An accelerator is a good bet, though, if you do a lot of work with large spreadsheets or databases, or any other application requiring your Apple II to calculate often. If the author of a 700-page novel about a young man growing up in America decides after writing the last page that the story of a girl coming of age in Hungary will sell better, his Apple needs an accelerator: The machine's going to be doing a lot of searching and replacing.

MASS STORAGE

If you've accumulated a number of disks or use several different programs, consider a mass-storage device—a disk drive that holds more than the 5 $\frac{1}{4}$ -inch Apple floppy's 143K of information. That 143K isn't very much—here at *inCider*, we can't squeeze the text of even half an issue onto a 5 $\frac{1}{4}$ -inch floppy.

Mass-storage devices range from the 3 $\frac{1}{2}$ -inch 800K **UniDisk 3.5** (see Reviews, July 1986, p. 26) to 20-

megabyte hard disks (see "Hard-Driving Disks," September 1985, p. 24, for a comparison evaluation). The pattern of 8 bits (the state of each memory cell in your Apple, electrically either on or off) that make up a character, a unit of information, in ASCII code is called a *byte*. A *kilo-byte* (K) is approximately 1000 bytes, and a *megabyte* equals about 1,000,000 bytes, or 1000K. Your 5 $\frac{1}{4}$ -inch disk holds about 143,000 bytes; your 3 $\frac{1}{2}$ -inch disks, 800,000; and a 10-megabyte hard disk, 10,000,000.

A 3 $\frac{1}{2}$ -inch disk holds about five times as much as a 5 $\frac{1}{4}$ -inch disk, but a 5-megabyte hard disk has nearly 36 times the capacity of an Apple floppy. You may not need a hard disk. If you use only AppleWorks, for instance, with start-up, program, and two data disks, you'd be wasting money if you bought a hard disk. A single 3 $\frac{1}{2}$ -inch 800K disk would handle your needs.

Hard-disk drives will soon be appearing in SCSI (small computer systems interface) form. Any SCSI-card-equipped Apple can use any SCSI-standard peripheral. Until now, you were limited to a choice of specifically Apple hard-disk drives, such as Xebec's (First Class Peripherals') reasonably priced **Sider** (see Reviews, April 1985, p. 93, and Editors' Choice, May 1985, p. 128) or AST's **MicroStor**.

The SCSI advantage lies not only in its portability from machine to machine, but in the ease with which you can attach up to seven mass-storage devices along your SCSI bus to a single SCSI-interface card (in only one peripheral slot). If your data requirements are huge—more than 20 megabytes—SCSI is worth the investment. (See "Are You Ready for SCSI?" March 1987, p. 55, for more information.)

You should also consider a hard disk's backup capabilities. AST's MicroStor, First Class' Sider, and some others offer tape backup. That's the quickest way to copy the information as protection against accidentally erasing your hard disk. Apple's ProFile offers floppy-disk backup—you copy the information from your hard disk to lots of floppies. It's slow, but reliable.

A hard disk has still another advantage over floppy disks of any size—it's faster. Every time you use a floppy, the drive takes time getting started. A hard disk is always spinning and spins faster than a floppy.

MANAGING YOUR FILES

Hard-disk manufacturers include some software with their products. It partitions and formats your hard disk; that is, it separates your hard disk into areas for different operating systems. Most hard-disk-drive users want ProDOS predominantly, but it's good to know that you can also find a place for your old DOS 3.3, CP/M, or Pascal programs and files. Apple's ProFile runs only ProDOS and Pascal; most of the newer models run all operating systems.

If you want to use DOS 3.3 on a UniDisk 3.5, Apple can't help. But MicroSparc's **UniDOS 3.3**, Gary Little's **amDOS**, or Nordic Software's **Profix 2.2** can set up your UniDisk to run DOS 3.3.

Putting data files on your hard disk is simple—just transfer them from your floppies with a copy program such as the ProDOS Filer, found on your ProDOS User's Disk. (You'll probably have to copy them file by file; only a few copy programs let you duplicate a whole volume at a time.) You may be out of luck, though, if a program you want to transfer is copy-protected. A bit-copy program, such as **Copy II Plus** or **Diversi-Copy** (see Editors' Choice, January 1987, p. 160), may help. (The ProDOS



With 800K of storage, Apple's UniDisk 3.5 holds five times as much information as a floppy.

Filer is probably the weakest of copy programs, and it's one of the slowest, too.)

So your disks are piled to the rafters, and you decide that mass storage will tidy things up. But mass-storage devices straighten out your software about as much as putting all your clothes into one large drawer straightens out your closet: You'll know where everything is, but you may not be able to find it. (See the sidebar, "ProDOS Basics," for details of volume organization.)

That's why you face a software decision. If you want to keep all your files and programs in one place, you need a file manager, and the ProDOS User's Disk or IIC System Utilities won't do.

This special software can be as simple as a short BASIC program or as complex as **KIX**, a complete front end for ProDOS that facilitates hard-disk use by adding disk-based commands to ProDOS. KIX also works within AppleWorks (but you can't use a macro program, such as Beagle Bros' MacroWorks or The Software Touch's AutoWorks, at the same time).

A number of AppleWorks users recommend Pinpoint's **RunRun** ProDOS desktop manager (see "RunRun: Pinpoint Meets Programs," November 1986, p. 78). This program's advantage is that it works with the AppleWorks-accessories program Pinpoint (see "Desktop Power," March 1986, p. 34, and Reviews, July 1986, p. 37) and its associated modules, such as KeyPlayer macros.

Programmer Alan Bird's **Better BYE** ProDOS patch (supplied on many program disks from The Software Touch, Beagle Bros, and others) also serves as a simple file manager. Executed as a STARTUP program on your hard disk (it also takes effect automatically when you exit a ProDOS program), it lists pathnames and filenames, to make program selection easy.

Glen Bredon's **ProSEL** uses a more traditional ProDOS approach and is a lot cheaper. This low-cost file manager gets high marks from many users, but is available only by mail-order from the author.

The simple reason for all this complexity in organizing files is that ProDOS was created in a world of 143K disks. When you boot a program disk, your Apple looks for ProDOS, which in turn looks for the first .SYSTEM file in the program. On an everyday 5¼-inch disk, ProDOS would find only one .SYSTEM file, because one program pretty much exhausts the capacity of the disk. On a large-capacity disk—a hard disk or even a UniDisk 3.5—you can have two or more .SYSTEM files, one for each program.

Your Apple II scans peripheral slots 7 through 1, in that order, as it looks for a disk drive. You should install your boot drive—hard disk, UniDisk, or floppy—in the highest slot. What do you want to see when you turn on the computer? The BASIC prompt ()? Then copy ProDOS and BASIC.SYSTEM to your hard-disk drive and attach it to your Apple in slot 7. AppleWorks? Copy ProDOS, Apiworks.System, and all the rest of the files on the AppleWorks Startup and Program disks to your 3½-inch disk, and put the UniDisk controller into slot 6 (the slot traditionally reserved for disk cards).

RAM TOUGH

Beyond making your Apple run faster and giving it more information and programs with which to work, what else can you do to enhance its power? RAM disks provide a totally different way to use more information.

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that old Apple had to go through the whole tape until it found the information it needed. It was like a tape recorder without "fast forward": If you wanted to hear the last song, you'd have to hear them all.

It was slow. Keeping information on disk is faster, but it's still sequential—like using a tape recorder's "fast forward" button. Even faster than disk access is random access. It's not random the way lottery numbers are; it's more accurate to call it nonsequential or direct access. When your Apple wants information at the end of a random-access storage medium, it goes there directly, as you might put the needle of a phonograph record directly on a song.

An Apple's random-access memory (RAM) is very small—the 6502 microprocessor can call upon only 64K memory locations at a time. That's not even half the capacity of a single 5¼-inch disk, and only a small fraction of the 20,000K on a big hard disk. The series of instructions that make up a program grab almost all of that 64K, so using RAM to store data files just isn't an option.

Ingenious Apple II users quickly discovered that you can access more than 64K of RAM by splitting 128K into two 64K "banks," and calling on one bank at a time. (See "Two Roads to Memory Expansion" and "Bank-Switched Memory," August 1986, pp. 46 and 50, for more information.) Bank switching quickly became standard in Apple IIs—in a file with an extended 80-column card in its auxiliary slot, the "extended" part is an extra 64K of RAM. Most programs written today require 128K—a neat trick for a microprocessor that can address only 64K.

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SOUPING UP APPLEWORKS

AppleWorks pushed RAM expansion into the limelight. In its two-143K-disk version, most of AppleWorks stays on disk. That's why the disk drive whirs when you remove a data file from the desktop. The file isn't on the disk, nor is the desktop, but the instructions for removing a file are on disk. AppleWorks' disk-based history is also the reason its "integration" works so well: The AppleWorks desktop is 55K of RAM containing just the data files your Apple's using currently. You can switch among files quickly because they're in RAM. The AppleWorks clipboard is in RAM, as well.

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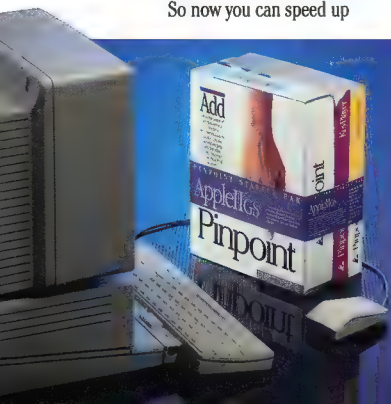
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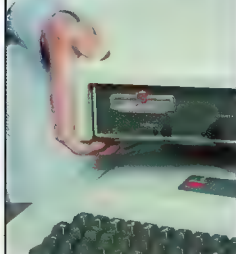
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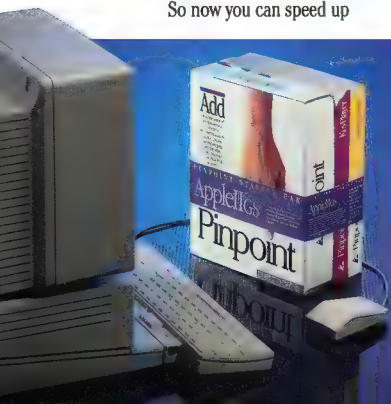
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But those of you with the right stuff ... prepare yourself. Because the Phasor is like nothing you've heard before. It's a sound effects synthesizer that makes games explode into life. A music synthesizer that will stun you with 4 watts of stereophonic sound. And a speech synthesizer so realistic, it will send shivers up your spine.



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Steve Wozniak, the creator of Apple Computer

What's best, the Phasor works with more off-the-shelf software than any other sound card you can buy. So now all your favorite games — like Skyfox™, Under Fire™, Willy Byte™, Tactical Armor Command™, Maze Craze™, Zaxxon™ and Ultima IV™ — can have shattering sound effects. Educational packages like Music Construction Set™, Guitar Master™ and Music Star™ are also dramatically enhanced.

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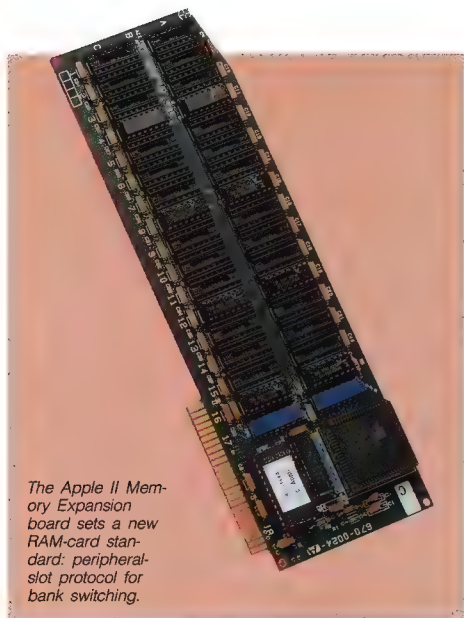
The Phasor comes with its own easy-to-use software (ProDOS based), including 30 ready-to-run, non-copy protected songs and sound effects along with a Music Editor, Sound Effects Editor and Text to Speech program. And of course, it carries our no-hassle, five-year warranty.

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The Apple II Memory Expansion board sets a new RAM-card standard: peripheral slot protocol for bank switching.

the ProDOS Filer first, to create a subdirectory of /RAM before starting AppleWorks. (See the accompanying sidebar, "ProDOS Basics," for more information on directory structure.)

A WORD OF ADVICE

When you buy software, don't forget to ask whether it works with your hardware. Don't get stuck with a copy-protected database manager you can't transfer to your hard-disk drive, or a word processor that ignores RamWorks or your Apple Memory Expansion card, or a telecommunications program that produces a busy signal if TransWarp is speeding up your Apple. For advice and information, ask your dealer, the manufacturer, or your user group, write *inCider*, or call our bulletin-board system (603-924-9801, 24 hours a day).

"There's no advantage to using newer chips or adding memory to any version of the Apple II unless you also have software that will take advantage of the changes," says Tom Weishaar, editor of the newsletter *Open-Apple*. He was talking about upgrading the Apple II Plus, but his words apply to hard-disk drives, accelerators, UniDisks, RAM cards, and the IIs as well. (See the accompanying article, "The GS Upgrade: Should You Go for It?" p. 55.) Your hardware is only as powerful as the software using it. ■

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THE GS UPGRADE

SHOULD YOU GO FOR IT?

Sizing up the GS upgrade: The promise of 16-bit software, plus terrific graphics and sound, is tempting IIe owners to make the switch.

by Eric Grevstad, Review Editor

Hard disks and memory expanders are great, but anyone thinking of upgrading a IIe today must take a long look at the ultimate add-on: Apple's IIgs upgrade. At \$499, it's not cheap, but it's the best bargain an Apple buff can buy: the GS' 16-bit power and superb sound and graphics, at half the cost of a separate new system.

Your Apple dealer must perform the upgrade, though technically it's nothing you couldn't do yourself. The process is best described as "lift sheep's clothing, insert wolf." Except for the IIe's power supply and speaker, everything inside the case is replaced by a new GS motherboard and base pan with back panel. (The dealer returns your IIe motherboard to Cupertino, thanks to Apple's proprietary passion against ROM chips floating around.) Your new machine is internally a complete IIgs, with 65C816 processor, 256K of memory, super-hi-res composite or analog-RGB video, sound-synthesizer chip, memory and expansion slots, SmartPort disk interface, and all the rest.

Externally, you'll give up the snob and/or sex appeal of the GS case, and you won't have its mouse or keyboard (or keypad, either, unless you're converting a new platinum IIe and thereby spending \$829 plus \$499 for the equivalent of a \$999 GS). You will, however, have the GS' Apple Desktop Bus port to connect those or later devices.

While the GS upgrade gives you equal access to new 16-bit as well as existing 8-bit software, it's worth remembering that \$499 will be just the start of your expenses. Besides dealer installation, you'll almost certainly need a mouse (\$99) and 3½-inch disk drive (\$399) if you don't have them already.

We're already seeing GS software that requires 512K or more instead of the standard 256K, and neither an auxiliary- nor a peripheral-slot IIe expander will work; you

must buy a GS memory card, whether from Apple, AST, Applied Engineering, Orange Micro, or MDideas. Also, to be honest, a GS without Apple's analog RGB monitor (\$499) is about as much fun as a deflated basketball.

For now, the biggest factor in weighing the GS upgrade is the software you want to use. For conventional applications such as word processors, databases, and spreadsheets, the upgrade has two advantages: the chance to play with text and background colors, and about two and a half times the IIe's processing speed. If speed is most important to you, though, Applied's TransWarp card in a IIe outpaced the GS in our tests. It runs at roughly 3.3 times standard IIe speed.

On the other hand, while today's GS productivity packages, such as MultiScribe, MouseWrite, and VIP Professional (the IIe version of which won't work on the GS), offer little more than their 8-bit counterparts, tomorrow's are more likely to take advantage of the new model's 16-bit architecture and a megabyte or two of memory. The GS should also lead the way in desktop publishing, though the 8-bit Springboard Publisher looks like a surprising early contender.

And if you're interested in creativity (graphics, sound, and music), the GS is definitely the way to go. The same is true of educational software, where developers are just beginning to explore the machine's color, speech, and other capabilities.

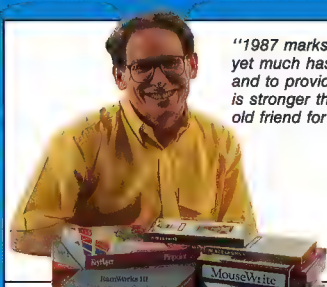
If you're still on the fence, there's no harm in staying there; the upgrade offer, Apple assures us, has no time limit (though a \$100 upgrade rebate, for people who bought a IIe between July 15 and September 14, 1986, expires June 30). You can have GS power now, or wait awhile, scanning the software market and saving up for that RGB monitor. ■

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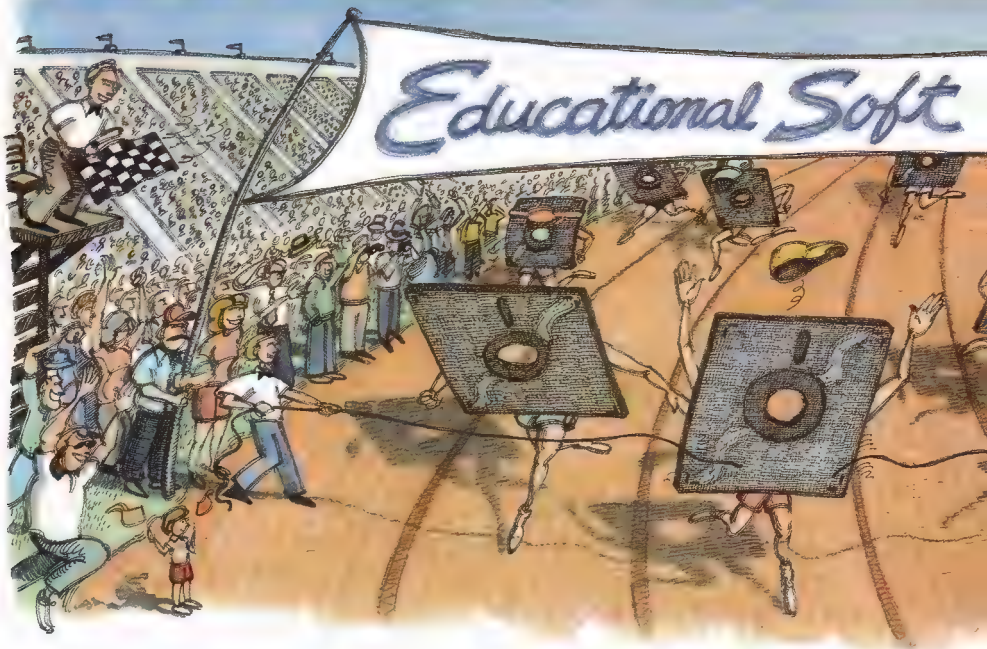
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EDUCATIONAL SOFTWARE: WHO'S WINNING THE RACE?

In the educational-software marathon, the vendors that finish the race will be those that can meet teachers' unique needs for flexible, affordable classroom programs.

by John W. Coster

Educators have figured it out. No longer can they be stereotyped as teachers who quiver at the sight of a computer. Today's teachers are aggressively pursuing classroom computer use, and they want more control over the technology, with new types of software.

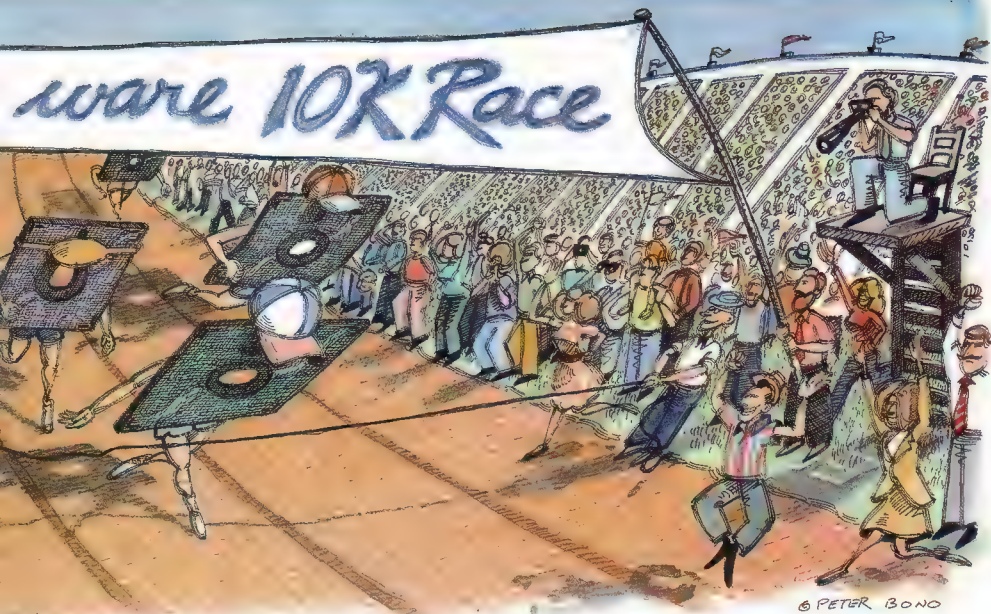
No longer is drill and practice the mainstay of teaching. Educators want programs that are flexible enough for a number of different applications. They want training, and they want improved access to software.

Publishers are beginning to meet the demand for more creative software, but getting it to teachers in an affordable way with the necessary training is still the main stumbling block.

NO MORE DRILL AND PRACTICE

When computers were first introduced into the classroom, software was primarily of the "drill and practice" variety—that is, programs that teach through repetition. Helping students memorize lessons in any subject area, from math to history, seemed like the perfect application of this new technology. The computer would never tire of asking students the same questions over and over. Teachers were free again to help individual students while others worked at the computer. Students, intrigued by the novelty of computers, were motivated to do their lessons.

It didn't take educators long to discover, though, that "canned" software not only forced them to change their objectives to match the program's purpose, but was also boring their students.



Today teachers look for flexibility when they evaluate software. "Successful educational programs let teachers build applications into their existing curricula," says Neil Davidson, of the Massachusetts State Department of Education in Springfield.

Davidson set up and now maintains a computer center with a library of most of the top educational packages. About 30 teachers per week come to the center to seek his advice, preview software, and borrow programs. Packages such as **Bank Street Writer**, **The Newsroom** (see Reviews, August 1985, p. 64, and September 1986, p. 98), and **The Print Shop** (see Reviews, September 1984, p. 132) are popular applications because they break away from the "canned" approach of drill and practice software, he observes.

Teachers can also easily tailor these programs across several curriculum areas. Sandra Cooper, computer coordinator for 35 schools in Ozone Park, New York, looks specifically for programs she can modify to meet her district's needs. Cooper says she has little use for commercial software that's "tutorial without requiring much student or teacher input."

To find programs that offer the flexibility they're seeking, teachers are turning to programs that weren't designed originally for the classroom. For instance, Frederick Johnson, computer coordinator for a small school on Staten Island, New York, explains that his classes use **AppleWorks** (see Reviews, January 1987, p. 28), a program oriented initially toward the business market. AppleWorks, Johnson says, produces educational benefits in several subject areas and "can be used for a whole year, not just once and put on a shelf."

In addition to AppleWorks, the focus of programs like Bank Street Writer and desktop-publishing programs such as The Newsroom and The Print Shop has shifted from home use to schools because they meet teachers' curricular needs.

While educators have discovered some good software, they say further improvements are necessary. Irene Vassos, computer coordinator for the Pittsfield, Massachusetts, school system, says she'd like to see educational programs such as The Newsroom become less like games and mirror more accurately the work environment.

Several educators share this opinion, including Allen November of the Wellesley, Massachusetts, schools. He says he believes students should learn to use computers in real-life situations.

November has set up a computer lab where students "contract" their services as business consultants, developing business plans and budgetary forecasts and solving general business problems. November cautions, though, that before schools introduce computers into the classroom, they must direct their energy toward improving fundamental skills such as reading, writing, and mathematics. To put computers into the classroom before students master the basics is "putting the cart before the horse," November says.

Other educators suggest that publishers produce less-individualized programs to encourage classroom activities. Some teachers, happy with the word-processing programs available, would like to see publishers create more database applications. Teachers can easily modify databases to meet curricular objectives and teach research skills.

"Word processing was the first level of software application adapted for individual curricular needs. I believe as teachers become more familiar with computers, the next significant level will be databases," Neil Davidson predicts.

THEY HEARD YOU

Publishers have heard many of the teachers' complaints and are working to develop programs that support the educational flexibility teachers want.

Sunburst Software's computer-division vice president, Marge Kosel, echoes teachers' sentiments. "Educators need to think of the computer as a tool to teach new concepts and should modify their curriculum accordingly. If what we're doing with the computer is just drill and practice, then it's a waste of a machine," she says.

In Cambridge, Massachusetts, Tom Snyder Productions is dedicated to going far beyond drill and practice: It creates programs designed to be teachers' assistants. A new series of products called **Decisions, Decisions**, for instance, puts the teacher in charge of the learning process, explains Tom Snyder, company president. It lets the teacher lead class discussions on subjects ranging from urban problems to the role of a superpower in other countries' internal affairs.

Broderbund discovered how to meet teachers' software needs almost by accident. Teachers simply started using its home products, such as Bank Street Writer and The Print Shop, in schools. Says Broderbund's group-marketing manager Diane Sipes, what happened by accident has been so successful that Broderbund is now targeting the education market. That new attention has produced revised packages that include teacher manuals with suggested learning activities, as well as a new line of fun, flexible programs, she notes.

Jan Davidson, founder and president of Davidson & Associates, publishers of **Math Blasters**, **Word Attack**, and, most recently, **Homeworker** (see Reviews, March 1987, p. 26), says software publishers can add value to the educational process in two ways.

The first is by offering productivity tools to help students work more efficiently. **Homeworker**, Davidson says, is a good example of such a product. It comes with six modules, from "outliner" to "grade keeper," to help students organize their schoolwork. The second way to enhance education is by offering teachers tools to help with activities they don't like, such as drill and practice, she says. To be truly useful, though, products have to go beyond traditional drill and practice to offer features such as editing mode, to let teachers write their own drills, and pre- and post-test measurement and recordkeeping functions, she says.

SOFTWARE TEACHERS CAN AFFORD

In addition to the philosophical issues of what makes good classroom software and how teachers should incorporate it into the curriculum, educators face a number of practical issues, such as finding the money to buy enough original copies of program disks, let alone backup disks.

"We already have plenty of materials teachers can't take advantage of," says Bill Dinsmore, president of The Learning Company, of Menlo Park, California. "We really don't need that much new software. Vendors need to make what exists easier and more accessible."

Holly Jobe, of Pottsgrove Elementary School in Stowe, Pennsylvania, agrees: "Software publishers don't have to make more products, since teachers are being bombarded with too much."

Licensing agreements would let more students have access to programs, they say. Teachers claim that making their own copies would eliminate the problem of getting approval for purchase orders—for backups that will probably be destroyed by the day-to-day abuse a popular program might receive.

"The day-to-day struggle of getting more equipment [and software] prevents teachers from being able to spend their energy implementing creative uses of computers," adds Irene Vasso.

Vendors are beginning to explore different ways to meet teachers' needs. Site-licensing programs are becoming more common, and many vendors offer multiple-program purchases called "lab packs."

Susan Schilling, MECC's vice president of development and creative directions, agrees that educators spend too much time trying to obtain software and evaluate it. "Educators don't have time to do much more than planning what they'll do tomorrow," she says. MECC provides licensing agreements that let schools make multiple copies of all MECC programs.

"The technology is already beyond the needs of the classroom," says Dinsmore of The Learning Company. He says the firm is focusing its future on the needs of educators and recently developed a program to offer lab packs of five sets of Learning Company products for \$60 per pack.

Two other publishers have adopted distribution plans to address teachers' needs. Krell Software (St. James, New York) and Logo Computer Systems International (LCSI) of Lachine, Quebec (with U.S. offices in New York), also offer site-licensing arrangements.

According to Krell's Mark Friedland, a license for its **SAT** program usually costs \$500 for each high school in a district. Schools can make unlimited copies of Krell's SAT or one of the other programs Krell offers under its licensing plan.

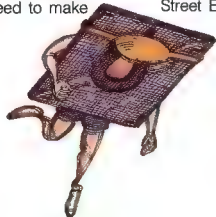
LCSI makes its **LogoWriter** program (see Editors' Choice, December 1986, p. 184) available on a school-, state-, or district-wide basis.

NEW TECHNOLOGIES, NEW CHALLENGES

The biggest challenge in educational software, says Scholastic Software's Connie Connors, is to decide how to unleash the power of new technologies such as CD-ROM, interactive video, and expanded sound and graphics capabilities.

"There's so much information out there that the computer is capable of handling that we need to teach students how to use [the machine] and teachers how to use the information to [enhance their] teaching," Connors says. As computers develop more capabilities, teachers must learn how to tap into the technology through software, she adds.

For example, Connors points to Scholastic's **Talking Text Writer** (see Reviews, March 1987, p. 103), a reading and writing program that combines word processing and speech synthesis. The program comes bundled with Street Electronics' **Echo Plus** board (see Reviews, May



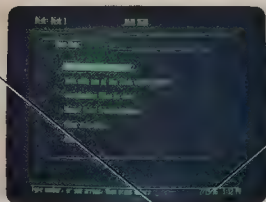
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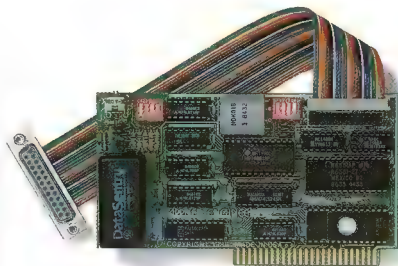
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1986, p. 100), a speech synthesizer that lets students hear what they typed into the computer.

Gone is the day when teachers purchased a program only because it was technologically new. Educators are demanding applications they can incorporate effectively into their own curricula. When the educational-sales market begins to slow down, the survivors will be those vendors that meet teachers' individual classroom needs. ■

John Coster is a computer consultant and co-owner of an educational-software retail business. He's also a free-lance journalist and former school and human-services administrator. Write to him at 156 Old Street Road, Peterborough, NH 03458.



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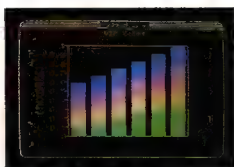
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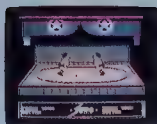




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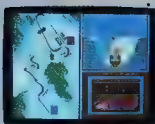
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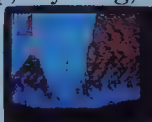
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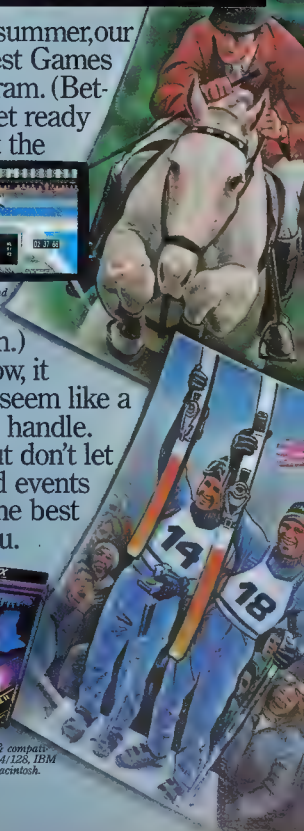


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There's a new British Invasion on the horizon. It's not rock 'n' roll, though: This time it's classroom software, and U.S. schools will get a chance to try it out this fall.

by Helen Bryman Kelly

Where the sky seems always overcast, where the fog and the lager are thick, where lunches and school days linger long after ours, in England, educational software is a quiet business.

But while business may be quiet, the software itself speaks loudly. Programs are inexpensive, the equivalent of 3.75-24 U.S. dollars. They're also compact—600 lines of BBC BASIC is common—and tend to focus on investigation rather than right and wrong answers. In addition, the British government plays a large role in promoting quality educational software.

Many American teachers and developers have wondered whether British software is appropriate for U.S. schools and homes. This fall you'll have a chance to decide for yourself. Thanks to a British-American collaboration, English and Spanish versions of math and music software for the Apple II family will be available in the U.S. and Canada by the 1987-88 school year.

ACORNS, NOT APPLES

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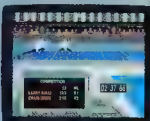
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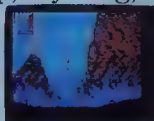


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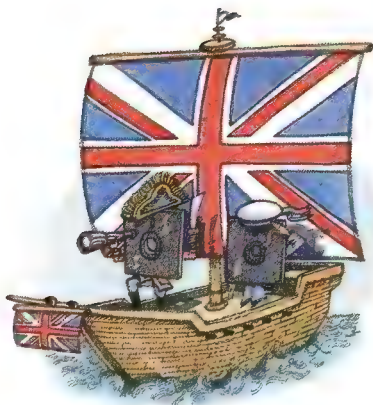
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THE BRITISH ARE COMING! THE BRITISH ARE COMING!

There's a new British Invasion on the horizon. It's not rock 'n' roll, though: This time it's classroom software, and U.S. schools will get a chance to try it out this fall.

by Helen Bryman Kelly

Where the sky seems always overcast, where the fog and the lager are thick, where lunches and school days linger long after ours, in England, educational software is a quiet business.

But while business may be quiet, the software itself speaks loudly. Programs are inexpensive, the equivalent of 3.75–24 U.S. dollars. They're also compact—600 lines of BBC BASIC is common—and tend to focus on investigation rather than right and wrong answers. In addition, the British government plays a large role in promoting quality educational software.

Many American teachers and developers have wondered whether British software is appropriate for U.S. schools and homes. This fall you'll have a chance to decide for yourself. Thanks to a British-American collaboration, English and Spanish versions of math and music software for the Apple II family will be available in the U.S. and Canada by the 1987–88 school year.

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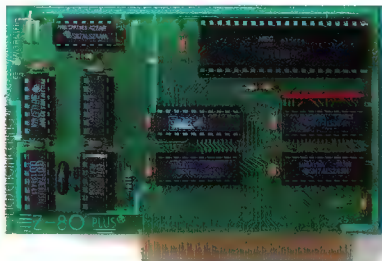
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In *Pirates* there's action behind the scenes and in the mind, but there's little evidence of it on screen. These programs introduce coordinates to the primary-school set and help children develop visual strength and prepare for geometry. Here the teacher has set the features at two dimensions (although three dimensions are possible), clues in vectors, and all positive numbers.

signed to let kids get immediate feedback from a teacher, and at the same time they see actions on screen in response to their own ideas. The software also seeds off-line investigations: It lets students work independently and come back to the group when they're ready."

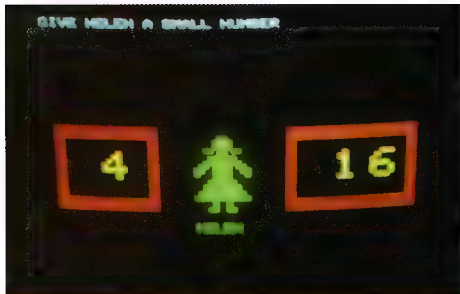
The programs let students go through the trial-and-error process graciously. "Remember teachers telling us that trying and failing is learning?" asks Mike Ellis, former managing director at Ega Beva Software, an educational software company in southwest England. "They meant it. It's good rhetoric, but failing didn't feel like a way to grow more clever when we had to talk out loud about ideas new to us. Someone always said, 'That's silly.'" (For more information on the Chicago Project/Shell Center programs, contact Mike Ellis at 203-776-7113.)

Many young people don't grow up with investigative learning. They still want privacy with the computer, Ellis says. "Children can try and fail at anything at all. Then they can go on to try more ideas or change strategies until something that feels like success turns up. That way, the young person feels in control, rather than vulnerable, and trial and error is productive [and] constructive," he continues. "Since in education there's very little of value that's right or wrong—most of what's educationally sound is in the gray area that requires some judgment—we can give kids a computer with good educational software and let them work on strategy. When they're ready to join a group or ask the teacher for help, they'll go. And that will be when they're feeling confident and ready to bring their ideas to others."

Ann Lewin, president of the National Learning Center/Capital Children's Museum in Washington, D.C., is enthusiastic about helping make British software available in the U.S.: "The software is beautifully conceived and founded on such sound developmental principles as intrinsic motivation, interactivity, feedback, and open-endedness," she observes. "My staff and I look forward eagerly to the materials being available on American computers, and we'd like to use them as the basis for developing interactive science and math exhibits here." The Chicago Project programs will be exhibited at the museum from May 19 through September 5.

GOVERNMENT FOR THE SOFTWARE

British software developers and teachers, though, have had their headaches keeping up with the government's pace of change. The GCSE (General Certificate of Sec-



In *Jane* the teacher and the computer are copresenters. The teacher sets the stage at increasingly advanced and abstract levels to help students prepare for algebra. As with many British programs, the documentation stresses that using computers is productive and fun. It also offers professional-level training and practical suggestions combined with respect for the important role teachers play.

ondary Education) exam says, "Facts are out, thinking is in." Training at preservice and in-service levels imposes sometimes-inconvenient requirements that teachers learn new ways of thinking about what it means to educate a child.

"We saw advances in information technologies as a compelling force for advances in education," one government official explains. "Here were exciting opportunities for teachers to grow professionally, to once again be important people in the public's eye. Yet with regard to the uses of technology, we were drifting toward drill. We had to take the risk, leap forward into the little-known. The irony was too obvious for us to do anything less."

British-government policy initiatives—undertaken by Sir Keith Joseph, recently retired Secretary for Education and Science, and now implemented by the current Minister of Education, Kenneth Baker—reflect a systematic approach toward implementing a personal vision of education. And to help create national traditions in this direction, the government has instituted additional policies on pupil evaluation and training.

A new format for national assessment of educational performance has been created. It now covers four areas: knowledge with comprehension, data handling, experiential learning, and oracy (the ability to articulate your rationale or your thinking process).

This year's task is to build a section on computers into the exam. Officials are investigating several options for measuring problem-solving ability at the computer, and are examining various pieces of software to determine which will become test items.

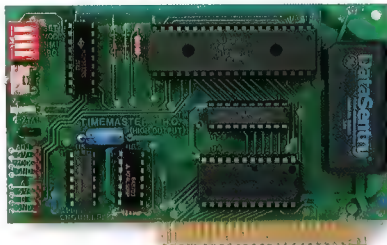
Preparing students for the new assessment will require new teaching skills, and the British government is paving the way by imposing strict standards for both undergraduate and in-service teacher training.

At teacher-training colleges, rhetoric is fine—if solid practices back it up. To demonstrate the point, the government has suspended all accreditations and considers each case individually. To achieve accreditation, an institution must demonstrate that prospective teachers are learning about structure and management of open investigative environments, and practice techniques under close supervision.

THE SOFTWARE CHALLENGE

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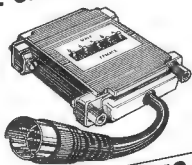
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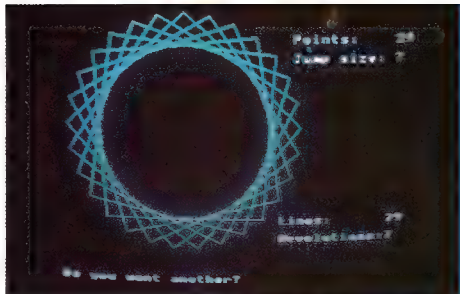
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isters noted that computing would be a critically important element in education; at that time, though, no one was certain what the best uses of computers would be.

To remedy this perceived gap, the government set aside almost £20 million for a five-year grant project that would develop educational microelectronic products. The only requirement for application was an idea for a product that would promote problem solving in the area of information technology. Grant recipients were individuals, inner-city elementary-school teachers, new collaboratives, and prominent research centers.

Publishing the software that resulted from the government-sponsored plan was a tricky issue. As you'd expect, a number of entrepreneurial startups surfaced, but this "sticky wicket" wound up in the laps of book publishers. Should they sell software? And if so, what software should they publish?

"We were learning as we went, since software publishing is unlike book publishing in nearly every respect. And we were publishing software that required teaching skills our customers didn't have," says Roger Watson, managing director of U.K. Schools Division, Longman Group (U.K.) Ltd., the largest educational publisher in England.

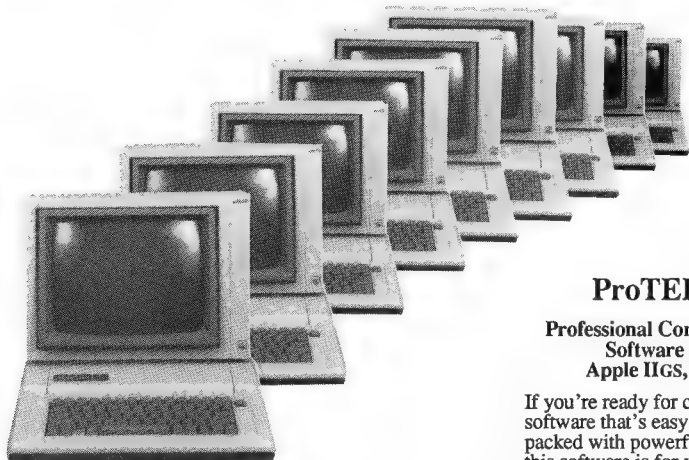
"As we thought about what to publish," Watson continues, "we decided to keep to an old U.K. tradition: If one uses a scarce resource, it should be used for something you couldn't do with existing resources. We wanted to learn what could be done with this technology that couldn't be done with books, and find out what things, if any, could be done better, and publish them."

"We've always wanted to work with the innovators rather than react to changes after they've been adopted in the schools," adds Michael Spincer, Longman's director of U.K. Schools Division publishing. "We look to long-term development, in which we learn alongside the educators. Naturally, cost problems and training issues arise, so sometimes color or technical virtuosity takes second place to educational excellence. But we stay closely involved with teachers, promote the training necessary to use the new product, [and] generally stick with it." ■

Helen Kelly is a free-lance writer and a designer of educational software and other materials. Write to her at 145 Cold Spring, New Haven, CT 06511.

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Creating Return-Address Labels

Your AppleWorks database can help you print your own return-address labels in a variety of styles.



by Ruth K. Witkin

Letters, birthday cards, magazine bingo cards, Christmas lists, party invitations, meeting notices, business mailings, and on and on—the times you paste a return-address label on an envelope are virtually endless. This month, you'll learn how to create a slew of your own labels just like the ones I did for myself, which are shown in the **Figure**.

My last discourse on mailing labels ("Customer Mailing Labels with AppleWorks," March 1986, p. 54) stirred up a bit of dust. Many readers, flushed with the success of printing the labels, wrote to express their elation at finally conquering what had seemed to them like AppleWorks outer space. A few readers just couldn't get AppleWorks and their printers to communicate properly. To the former, "you done good." To the latter, my apologies. The instructions in that March column could have been clearer.

PRINTER SETTINGS

Let's start this column at that point. The AppleWorks printer defaults—accepts top-of-page commands (Yes) and stops at the end of each page (No)—work fine with my ImageWriter. I don't have to change any specifications to print the labels properly. If you're working with a different printer, you may end up with one label on a page or gaps between labels. Chances are your printer needs the top-of-page setting changed to **No**. Here's how to do it: From the Main Menu, type **5** to bring up the Other Activities menu. Type **7** to *Specify information about your printer(s)*. Type **4** to *Change printer specifications*. Type **2** to select *Accepts top-of-page commands*. Type **Y** to change the value to **No**. Press the return key after each selection. Be sure that item **3—Stops at end of each page—is set to No**.

LABEL PAPER

To develop this month's column, I used form-feed, one-across labels 3½ inches wide by ¾ inch high. Given my 'druthers, I would have used narrower, 2½-inch labels, which suit a return address better, but couldn't find

them in the half-dozen computer-supply catalogues I scanned. Seems that one-across labels 3½ inches or wider are among the few standards in the computer industry.

KEYSTROKES

When you see such key combinations as OA-Y, hold down the open-apple key and type Y. With repeated combinations, such as OA-right arrow five times, hold down the open-apple key and press the right arrow key five times. If you make a typo, hit the delete key to back up the cursor and erase.

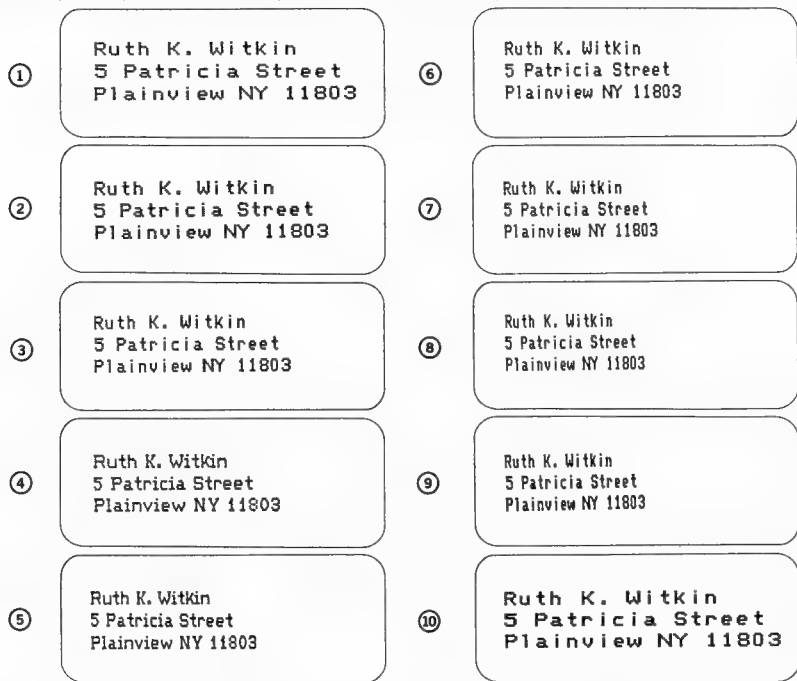
A DATABASE FROM SCRATCH

Use the AppleWorks Startup and Program disks to bring up a new database screen. When AppleWorks asks for a filename, type **MYLABELS** and press the return key. You should now see the Change Name/Category screen.

This database contains three categories and only one record—yours. Your cursor is on the C in Category 1. Press OA-Y to erase these words. Now type the following category names and press the return key after each one: **NAME, STREET, CITY/STATE/ZIP**. You may need more categories (P.O. box, suite number, company name), but leave them for later so that you can follow the instructions without having to modify anything. If you do insert new categories later, the customized screen layout and label-report format will disappear. Don't be concerned. At that point you'll know the techniques, so they'll be easy to reconstruct.

Now press the escape key. AppleWorks informs you that you'll automatically go into the Insert New Records mode. Press the return key and Record 1 appears, awaiting your entries. In the NAME category, type your first name, middle initial, and last name. Press the return key. Now type your street address and hit the return key again. And finally, type in your city, state, and zip code and press the return key. An empty Record 2 should now be on screen. You have no other records to enter, so press OA-Z twice to zoom in to the multiple-record layout.

Figure. My own return-address labels produced with an AppleWorks database, with examples of the kinds of characters the ImageWriter printer-control codes produce. The numbers correspond to the codes in the Table.



CHANGING THE SCREEN LAYOUT

The entries in the record are crowded. Since there's plenty of room on screen, you can make things nicer to look at by increasing the column widths: Press OA-L to bring up the Change Record Layout screen. The cursor is in the NAME category. Increase its width by pressing OA-right arrow five times.

Now press the right arrow key to move to the STREET column. Increase its width by pressing OA-right arrow ten times (or as many more times as needed to display the entire street address).

Press the right arrow key to move to the CITY/STATE/ZIP column. Press OA-right arrow ten times—or more until the entry is fully displayed, but not so far that MARGIN drops off the screen. If this happens, press OA-left

arrow until MARGIN reappears. Now press the escape key twice to return to the multiple-record layout—quite an improvement.

DUPLICATING YOUR RECORD

You want to be able to print a batch of labels, so the next step is to copy your record. AppleWorks lets you make 99 copies of a record at a time. That's a bit much for now. Start with 14 copies, and you can later make as many more copies as you want. The cursor is on your first name. Press QA-C to start the Copy command. Press the return key to confirm *Current record*. Type 14 and hit the return key again. Instantly, the screen fills with your record. Store the database on disk by pressing the open apple-S key combination.

CREATING A LABELS REPORT FORMAT

Next, create a report format: Press OA-P to bring up the Report Menu. Type 3 and hit the return key to tell AppleWorks you want to create a labels format. Type MYLABELS and hit the return key again.

The Report Format screen appears with your cursor on NAME. You need to insert blank lines to separate the labels and print the lines properly on each label, so press OA-I to bring up the Insert a Category screen. Press the return key to confirm. A *spacing line above cursor position*. Now move past the categories and insert two blank lines below them by pressing the down arrow key five times. The screen should now display the message: "Each record will print 6 lines."

PREPARING TO PRINT

You don't need a report header at the top of each page of labels, so press OA-O to bring up the Printer Options screen. Now toggle the header setting from *Yes* to *No* by typing **PH** and hitting the return key.

The left margin controls where the printing starts. With the left sprocket on my ImageWriter as far left as it can go and the right sprocket shifted toward the center, a .4-inch left margin produces a well-balanced look. You're still in the Printer Options screen, so type **LM** and press the return key. Type **.4** and press the return key again.

Typical label paper is 12 inches long, but a paper-length setting of 12 inches causes a form feed between pages. Instead, tell AppleWorks that the paper length is one inch ($\frac{1}{16}$ inch high plus $\frac{1}{16}$ inch between labels), which will print the labels continuously with no extra lines at the top or bottom of a page and no form feed between pages: Type **PL** and press the return key. Type **1** and press the return key again. Now press the escape key to return to the Report Format screen.

VIEWING THE LABELS ON SCREEN

You can get an idea of how the printer labels will look by "printing" them on screen first: From the Report Format screen, press OA-P to bring up the Print the Report screen. Type **2** to select *The screen* (or, if more than one printer is listed, the number corresponding to *The screen*) and press the return key. And here are the first three labels. Looking good. Press the return key five times to display the other trios and return to the Report Format screen. Press OA-S to store the database on disk, which also returns you to the multiple-record screen.

PRINTING THE LABELS

You're all set to print. Don't bother to load any label paper yet because this is only a practice run. Turn on your printer. Now press OA-P to return to the Report Menu. Press the return key twice to confirm *Get a report format* and *MYLABELS*. Press OA-P to start the Print command. Type **1** (or the printer number) and press Return twice (the second time confirms one copy). The printer starts working and here are 15 return-address labels. (If they're not printed properly, refer to Printer Settings at the beginning of this column.)

USING SPECIAL PRINTER CODES

Clearly, these labels are plain-vanilla—ten characters to the inch and no pizzazz. The AppleWorks database doesn't offer a choice of character styles (such as boldface or proportional spacing), but printers do. Some printers offer many choices, others only a few. Chances are, your printer has special control codes that can really jazz up the labels.

Let's explore some codes that are available with the ImageWriter. If you're not working with an ImageWriter, don't panic. Just look through your printer manual for the control codes, enter them in the same way as the ImageWriter codes, and savor the effect.

The **Figure** shows the labels printed with a variety of ImageWriter control codes (listed in the **Table**), which you enter via the Special Codes option in the Printer Options screen. Most of these codes produce sans-serif characters, much like the characters you're reading now.

Some codes (Escape-p and -P) produce proportional spacing, which gives every character the width it needs and prints dense text, unlike standard spacing, which gives every character a fixed width, thereby leaving gaps between narrow and wide characters (for example, between the *i* and *m* in *him*). The proportional characters are serif-like with a hint of a vertical projection above and below the basic strokes. The condensed codes (Escape-e, -q, and -Q) produce narrow characters.

The boldface code (Escape-l), which you can use alone or in combination with other codes, causes the printer to double-strike, producing a darker and thicker letter. The headline code (Control-N) creates characters similar to those produced when you set your printer to 6 characters per inch from the Printer Options screen. The advantage is that you can combine headline (Control-N) with boldface (Control-l) to get a boldface headline, which you don't get when you set your printer to 6 cpi from the Printer Options screen and use the boldface control code.

To get an idea of how this works, enter the codes that produce large, boldface print: Press OA-O to bring up the Printer Options screen. Type **SC** to select *Send Special Codes to printer* and press the return key. You now see the SC: Special Codes

Table. ImageWriter control codes.

Control Code	Result
1) Escape-n	Extended (9 cpi)
2) Escape-N	Pica (10 cpi)
3) Escape-E	Elite (12 cpi)
4) Escape-p	Pica proportional
5) Escape-P	Elite proportional
6) Escape-e	Semicondensed (13.4 cpi)
7) Escape-q	Condensed (15 cpi)
8) Escape-Q	Ultracondensed (17 cpi)
9) Escape-l	Boldface
10) Control-N	Headline

screen. To enter the keystrokes needed by the printer, press the escape key and type a lowercase **n**. Now press the escape key and type **1**. To end the special codes, hold down the shift key and type **^**. This returns you to the Printer Options screen. Press the escape key to return to the Report Format screen.

If you have label paper, now is the time to load it. You can still get a good idea of what the labels will look like with standard printer paper. Press OA-P to start the Print command. Press the return key twice to confirm the printer and one copy. And here are labels with a different look.

It's a good idea to invest some time testing your printer's control codes, so that you'll know your options when you print your reports. The MYLABELS database is a good one to play around with. Before you start testing, though, delete (using OA-D) every record but one, so that you don't run out of paper and patience.

Next month, I'll explain how to get AppleWorks to print *three-across* mailing labels, something I've been known to maintain that AppleWorks can't do. ■

Ruth K. Witkin is a consultant in computer applications for business. She is the author of the hotCider Success with AppleWorks (inCider, CW Communications), Managing with AppleWorks (Howard W. Sams & Co.), and Personal Money Management with AppleWorks (John Wiley & Sons). Write to her at 5 Patricia Street, Plainview, NY 11803. Enclose a self-addressed, stamped envelope if you'd like a personal reply.

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by Randy Brandt

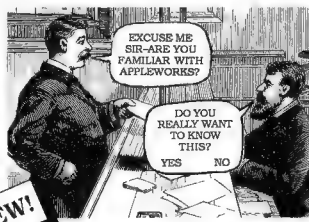
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by Rob Renstrom

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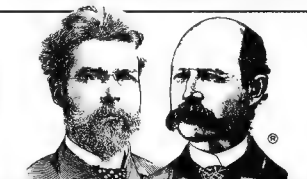
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String Manipulation with MID\$

Applesoft's MID\$ function lets you analyze text for editing or research.



by Dan Bishop

MID\$ is one of the most useful string functions available to the BASIC programmer. This tool lets you analyze any string variable in a variety of ways. MID\$ lets you determine whether a given substring occurs within a larger string (the "target" string) and, if so, where and how many times it appears. You can replace one substring with another, or simply insert a substring inside the target string. These are just a few examples; once you learn how MID\$ works, your imagination will lead you to many others.

Text Analyzer (see the **Program listing**) illustrates the power of MID\$ in dealing with string manipulations. Many word processors have built-in, sophisticated text analyzers, usually written in assembly language, but they function in much the same way as this program. Authors use text analyzers to obtain statistics relating to their own works, and literary researchers use them to determine probable authorship of old works. Text analysis has even found a place in many forensic laboratories.

EXTRACTING SUBSTRINGS

The simplest way to use MID\$ is in extracting a substring from a target string. You must know where the substring begins in terms of the number of characters from the beginning of the target string (J) and the number of characters you want to extract (K). For example, suppose you want to extract the word DAY from the following target string:

T\$ = "MAY DAY FROLICS"

D is the fifth letter in the target string, so J equals five. Since DAY is three letters long, K equals three. You therefore use the following expression, which assigns the word DAY to X\$:

X\$ = MID\$(T\$, 5, 3)

You can see that MID\$ requires three arguments (the items listed in parentheses). The first identifies the target string, then list the position of the first character in the substring and the number of characters you want to remove. If enough characters aren't left in the target string to satisfy the value given for K, MID\$ simply removes the remaining characters and stops.

Of course, you can assign the values five and three to variables such as J and K, and use them in the expression as well:

X\$ = MID\$(T\$, J, K)

The key to using variables this way is determining what values to use for them when dealing with a variety of strings.

Let's suppose you have a list of names consisting of a last name, a comma and space, and a first name. From this list, you retrieve one name as NM\$, and you want to extract this individual's first name as F\$ to include in a form letter. For the MID\$ function to work, you have to determine the correct values for J and K. Consider a sample name:

WASHINGTON, MARTHA

M is the 13th letter in this name, and MARTHA is six letters long, so the line F\$ = MID\$(NM\$,13,6) assigns the word MARTHA to F\$. The problem is to get your Apple to calculate these values so that the program can handle any name you throw at it.

Fortunately, the value for K is easy to come by if you already know J. Use BASIC's LEN function to obtain the number of characters (the length) of a particular string. LEN(NM\$) returns the total length of whatever name you pull from the list—for instance, 18 for the WASHINGTON, MARTHA example. If you subtract the value for J (13) and add one, you obtain the length of the first-name string.

In all cases, a blank space precedes the first letter of the first name. If you set up a simple loop that extracts a single character at a time and terminates when it obtains a blank space, the loop counter will give you the position of the blank space:

```
FOR I = 1 TO LEN(NM$)
  IF MID$(NM$,I,1) = " " THEN J =
    I: I = LEN(NM$)
```

NEXT I

Add one to J and you'll have the value for J in the MID\$ function. The following lines let you calculate K and extract the first name as F\$:

```
J = J + 1: K = LEN(NM$) - J + 1
F$ = MID$(NM$, J, K)
```


Program listing. Text Analyzer.

```

1 REM TEXT ANALYZER
2 REM BY DAN BISHOP
3 REM APPLESOFT ADVISOR
4 REM INCIDER, MAY 1987
5 REM *****
6 REM
10 GOSUB 1000: REM GET TEXT
20 GOSUB 1300: REM DISPLAY TEXT
30 FX = 0: GOSUB 1500: REM EDIT TEXT
40 IF FX = 1 THEN GOTO 20
50 GOSUB 500: REM INITIALIZE ARRAYS
60 GOSUB 1700: REM GET SEARCH STRING
70 GOSUB 3000: REM ANALYZE TEXT
80 GOSUB 4000: REM SORT RESULTS
90 GOSUB 5000: REM PRINT RESULTS
100 HOME
110 PRINT "DO YOU WANT TO RUN ANOTHER ANALYSIS"
120 PRINT "ON THE SAME TEXT? (Y/N) ";
130 INPUT X$
140 IF X$ < > "Y" AND X$ < > "N" THEN GOTO 100
150 IF X$ = "Y" THEN GOTO 20
160 END
495 REM
496 REM *****
497 REM INITIALIZE ARRAYS
498 REM *****
499 REM
500 FOR I = 1 TO 26
510 C$(I) = CHR$(64 + I)
520 C(I) = 0: W(I) = 0
530 NEXT I
540 S = 0
550 S$ = "": W$ = "N"
560 RETURN
995 REM
996 REM *****
997 REM ENTER TEXT
998 REM *****
999 REM
1000 HOME
1010 PRINT "HOW MANY LINES OF TEXT"
1020 PRINT "WILL YOU BE ENTERING?";
1030 INPUT NL
1040 DIM ST$(NL), C(26), C$(26), W(26)
1050 PRINT
1060 PRINT "WILL YOU BE ENTERING TEXT"
1070 PRINT "AT THE KEYBOARD? (Y/N) ";
1080 INPUT K$
1090 IF K$ < > "Y" AND K$ < > "N" THEN 1050
1100 IF K$ = "N" THEN 1200
1110 PRINT : PRINT
1120 PRINT "ENTER TEXT SO THAT EACH WORD IS"
1130 PRINT "FOLLOWED BY 1 & ONLY 1 SPACE."
1140 PRINT "SPACES ARE USED FOR WORD COUNT."
1150 PRINT "PERIODS ARE USED FOR SENTENCE COUNT."
1160 PRINT "DO NOT USE EXTRA SPACES OR PERIODS."
1170 PRINT "BE SURE EACH LINE ENDS WITH ONE SPACE."
1180 PRINT "*****"
1190 PRINT
1200 FOR I = 1 TO NL
1210 IF K$ = "N" THEN READ ST$(I): GOTO 1240
1220 PRINT "ENTER LINE # "; I; ":"
1230 INPUT ST$(I)
1240 NEXT I
1250 RETURN

```

TEXT ANALYZER

The accompanying program analyzes several lines of text to determine the number of times each alphabetic character appears, then displays the character count, word count, sentence count, and average word length for the input text. It lists each character, sorted according to frequency of use, with the count and percentage of each. Text Analyzer displays word counts by word length (between one and 13+ characters) and their percentages. Finally, it lets you enter a specific character string or word and reports the number of times the given string appears in the text. A sample of the program's output is shown in the **Figure**.

Figure. Sample output, produced from the following text: NOW IS THE TIME FOR ALL GOOD MEN TO COME TO THE AID OF THEIR COUNTRY. THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG.

```

TEXT ANALYSIS: 25WORDS: 2 SENTENCES.
=====
CHAR.FREQ.TABLE      89 CHARACTERS.
CHAR- CNT/%      WORD LENGTH CNT/%
C- 13/14.6 U- 3/ 3.4 1- 0/ 0
E- 10/11.2 G- 2/ 2.2 2- 4/ 16
T- 9/10.1 W- 2/ 2.2 3- 11/ 44
H- 5/ 5.6 Y- 2/ 2.2 4- 5/ 20
R- 5/ 5.6 J- 1/ 1.1 5- 3/ 12
I- 5/ 5.6 B- 1/ 1.1 6- 1/ 4
D- 4/ 4.5 K- 1/ 1.1 7- 1/ 4
N- 4/ 4.5 B- 1/ 1.1 8- 0/ 0
M- 4/ 4.5 V- 1/ 1.1 9- 0/ 0
A- 3/ 3.4 P- 1/ 1.1 10- 0/ 0
C- 3/ 3.4 X- 1/ 1.1 11- 0/ 0
L- 3/ 3.4 Q- 1/ 1.1 12- 0/ 0
F- 3/ 3.4 Z- 1/ 1.1 13- 0/ 0
=====
AVE.WORD LENGTH: 3.56 CHARACTERS.
# OF OCCURRENCES OF THE: 5
PRESS <RETURN> TO CONTINUE...

```

As written, the program has a few shortcomings. For example, you must enter the text to be analyzed either interactively from the keyboard or into the program itself as data statements between lines 2000 and 3000. Type your text so that a blank space follows every word, including the word at the end of each line, since the program counts blank spaces to arrive at its word count. Similarly, it counts periods to arrive at a sentence count, so you must take care that you enter no extra spaces or periods, and end each line with a single space.

Finally, the function that counts the number of occurrences of a given string takes its job quite literally. If you enter THE as the search string, the program increments the search counter each time it encounters THE, whether it's a separate word or part of another word such as THEIR or

Listing continued.

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Listing continued.

```

1295 REM
1296 REM *****
1297 REM DISPLAY TEXT
1298 REM *****
1299 REM
1300 P1 = 1
1310 HOME
1320 PRINT "HERE IS THE TEXT YOU ENTERED..."
1330 P2 = P1 + 10
1340 IF P2 > NL THEN P2 = NL
1350 FOR I = P1 TO P2
1360 PRINT I; ". "; ST$(I)
1370 NEXT I
1380 PRINT
1390 PRINT "NOTE ANY LINES TO BE CHANGED."
1400 PRINT "PRESS <RETURN> TO CONTINUE."
1410 INPUT X$
1420 IF P2 = NL THEN GOTO 1450
1430 P1 = P2 + 1
1440 GOTO 1310
1450 RETURN
1495 REM
1496 REM *****
1497 REM EDIT TEXT
1498 REM *****
1499 REM
1500 HOME
1510 PRINT "ENTER THE NUMBER FOR ANY LINE TO BE "
1520 PRINT "EDITED (OR ZERO WHEN DONE)...";
1530 INPUT L
1540 PRINT
1550 IF L = 0 THEN GOTO 1620
1560 IF L > NL THEN GOTO 1500
1570 PRINT ST$(L): PRINT
1580 PRINT "RETYPE, WITH CORRECTIONS:"
1590 PRINT : INPUT ST$(L)
1600 FX = 1
1610 GOTO 1500
1620 RETURN
1695 REM
1696 REM *****
1697 REM SEARCH STRING ENTRY
1698 REM *****
1699 REM
1700 HOME
1710 PRINT "DO YOU WISH TO COUNT THE NUMBER"
1720 PRINT "OF TIMES A CERTAIN WORD OR CHARACTER"
1730 INPUT "STRING APPEARS? (Y/N) "; SC$
1740 IF SC$ < > "Y" AND SC$ < > "N" THEN 1700
1750 IF SC$ = "N" THEN 1790
1760 PRINT
1770 PRINT "ENTER THE STRING TO BE COUNTED."
1780 INPUT S$
1790 HOME : RETURN
1989 REM
1990 REM *****
1991 REM PLACE TEXT LINES HERE.
1992 REM FORMAT AS FOLLOWS:
1993 REM 2000 DATA XXXX XX XXX
1994 REM 2001 DATA "XXX, XX X "
1995 REM USE QUOTES AROUND ANY
1996 REM LINE CONTAINING COMMA.
1997 REM NO QUOTES INSIDE TEXT.
1998 REM PUT <SP> AT LINE ENDS.
1999 REM *****

```

Listing continued.

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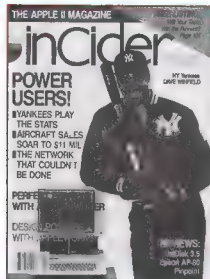
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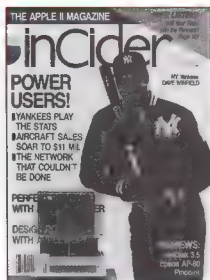
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OTHER. You can partially overcome this problem by entering @THE@ (where the @ symbols represent spaces). But in this case, the program won't count an occurrence of THE if it appears at the beginning of a line or before a punctuation mark.

You can correct each of these failures with appropriate subroutines. Including them here, though, would make the program too long for this column.

RUNNING THE PROGRAM

First answer the prompts asking for the number of lines of text to be analyzed and whether you're entering them from the keyboard. If you answer the latter question N, the program assumes you've entered text into its DATA lines and reads the specified number of lines into the text arrays for analysis. If you answer Y, a prompt asks for the number of lines you want to enter from the keyboard. Lines 1000-1250 handle all text entry.

The program next displays the entire text, ten lines at a time, for your approval. Each line is numbered. If you see an error, note the number of the line in which it appears. When the text display is finished, type the number of the line you want to edit, or zero to end editing. This part of the program (lines 1500-1620) recycles until you enter a zero, then displays the text again. The program continues beyond this point only when you accept the text with no further editing. Note the flag, FX, which indicates whether you've edited, and the way it controls the program in lines 30 and 40.

When you've finished entering text, the program sets all the array counters to zero and assigns alphabetic character values in sequence (A-Z) to the C\$(I) array, with C\$(I) = CHR\$(64+I), in lines 500-560. You then indicate whether you want to search for a character string or word during the analysis by typing Y or N (lines 1700-1790). If you answer Y, the program asks you to type in the string, then counts the number of times the given string appears within the program.

Text Analyzer displays a message as it analyzes each line (lines 3000-3220) so that you can keep track of its progress. The program uses MID\$(line 3050) to extract each character from the line, and, if the character is a period, increments the sentence counter. If it's alphabetic, the program increments the appropriate element in the character-counter array, as well as

Listing continued

```

2000 DATA NOW IS THE TIME
2001 DATA FOR ALL GOOD MEN
2002 DATA TO COME TO THE AID
2003 DATA OF THEIR COUNTRY.
2004 DATA THE QUICK BROWN FOX
2005 DATA JUMPED OVER THE LAZY DOG.
2995 REM
2996 REM *****
2997 REM ANALYZE TEXT
2998 REM *****
2999 REM
3000 HOME
3010 NS = 0:WL = 0
3020 FOR I = 1 TO NL
3030 PRINT "ANALYZING TEXT LINE ";I;". "
3040 FOR J = 1 TO LEN (ST$(I))
3050 X$ = MID$( ST$(I),J,1)
3060 IF X$ = "." THEN NS = NS + 1: GOTO 3130
3070 IF X$ = " " THEN W(WL) = W(WL) + 1:WL = 0: GOTO 3130
3080 FOR K = 1 TO 26
3090 IF X$ < > C$(K) THEN GOTO 3120
3100 C(K) = C(K) + 1
3110 WL = WL + 1
3120 NEXT K
3130 NEXT J
3140 IF SC$ = "N" THEN GOTO 3210
3150 FOR J = 1 TO LEN (ST$(I)) - LEN (S$) + 1
3160 IF S$ < > MID$( ST$(I),J, LEN (S$)) THEN GOTO 3200
3170 S = S + 1
3200 NEXT J
3210 NEXT I
3220 RETURN
3995 REM
3996 REM *****
3997 REM SORT DATA
3998 REM *****
3999 REM
4000 PRINT "SORTING RESULTS..."
4010 FOR I = 1 TO 25
4020 FOR J = I + 1 TO 26
4030 IF C(I) > C(J) THEN GOTO 4070
4040 T = C(I):T$ = C$(I)
4050 C(I) = C(J):C$(I) = C$(J)
4060 C(J) = T:C$(J) = T$
4070 NEXT J
4080 NEXT I
4090 FOR I = 14 TO 26
4100 W(13) = W(13) + W(I)
4110 NEXT I
4120 RETURN
4995 REM
4996 REM *****
4997 REM PRINT RESULTS
4998 REM *****
4999 REM
5000 HOME
5010 NC = 0:NW = 0:L$ = ""
5020 FOR I = 1 TO 26
5030 NC = NC + C(I)
5040 NW = NW + W(I)
5050 NEXT I
5060 PRINT "TEXT ANALYSIS: ";NW;"WORDS; ";NS;" SENTENCES."
5070 PRINT "===== "
5080 PRINT "CHAR.FREQ.TABLE ";NC;" CHARACTERS."
5090 PRINT "CHAR- CNT/% WORD LENGTH CNT/%"
5100 FOR I = 1 TO 13
5105 M$ = " ": IF I < 10 THEN M$ = " "
5110 N = C(I): GOSUB 5500

```

Listing continued

Listing continued.

```

5120 L$ = C$(I) + "-" + N$ + "/"
5130 N = INT ((C(I) * 1000 / NC + .5)) / 10
5140 GOSUB 5500
5150 L$ = L$ + N$ + " " + C$(I + 13) + "-"
5160 N = C(I + 13): GOSUB 5500
5170 L$ = L$ + N$ + "/"
5180 N = INT ((C(I + 13) * 1000 / NC + .5)) / 10
5190 GOSUB 5500
5200 L$ = L$ + N$ + " " + M$ + STR$(I) + "."
5210 N = W(I): GOSUB 5500
5220 L$ = L$ + N$ + "/"
5230 N = INT ((W(I) * 1000 / NW + .5)) / 10
5240 GOSUB 5500
5250 L$ = L$ + N$
5260 PRINT L$
5270 L$ = ""
5280 NEXT I
5290 PRINT "=====
5300 PRINT "AVE.WORD LENGTH: ";
5310 N = NC / NW: GOSUB 5500
5320 PRINT N$; " CHARACTERS."
5330 PRINT "# OF OCCURRENCES OF "S$": ";
5340 PRINT S
5350 PRINT "PRESS <RETURN> TO CONTINUE..."
5360 INPUT X$
5370 RETURN
5500 N = INT (100 * N + .5) / 100
5510 N$ = RIGHT$ (" " + STR$(N),4): RETURN
    
```

End of Listing.

the current word-length counter. When the program hits a blank space, it uses the value in the word-length counter to increment the appropriate element in the word-length-counter array, then resets it to zero. Finally, it searches the line for any matches with the character string you entered, and increments S each time it finds a match.

After analyzing all text lines, the program sorts (in lines 4000-4120) the character arrays in order of frequency and displays first the most common character. Also, since the program displays the word-length counters from one to 13, it includes all words longer than 13 characters in the number of 13-character words.

Sample output, generated in lines 5000-5510, is shown in the **Figure**. The next section treats this subroutine in more detail. A prompt at the bottom of the display asks you to press the return key to continue. Another prompt asks whether you want to run another analysis on the same text—useful if you want to do a search tally



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on several words. If you entered text from the keyboard, the program retains it for the next analysis. Your text is lost, though, once the program ends. This points out one advantage of entering your text in DATA lines—at least the text then becomes a permanent part of your program.

FORMATTED OUTPUT

Text Analyzer converts all data to be displayed on one line to string data, then concatenates the strings and displays them as a single 39-character string, L\$. Since the data contain a mix of alphabetic characters and numbers, a two-line subroutine (lines 5500-5510) converts any number N it receives to a four-character string, front-padded with blanks if necessary. The subroutine returns the four-character string N\$ and attaches it to the end of L\$. In this way the output columns are kept in line, and you can be sure that all numbers will require only four columns in the display.

Another trick maintains column alignment with the change from

single- to two-digit numbers (line 5105):
 $M\$ = "": IF I < 10 THEN M\$ = " "$

Now M\$ is used in line 5200, just before I is added to L\$. If I has two digits, then M\$ is null and adding it to L\$ has no effect. If I has only one digit, then M\$ contains a single blank space. This, when added to L\$ before I, has the effect of padding the single digit I with one blank space.

To round the percentages to a single decimal digit, the program uses the following general equation several times:

$$N = INT (C(I) * 1000 / NC + .5) / 10$$

Given that C(I) is the counter for the Ith character in the alphabet list, and NC is the total number of characters in the text, this equation first multiplies the decimal fraction, say 0.33333, by 1000, making it 333.33. Adding .5 forces rounding, so our example becomes 333.83. The INT function truncates the decimal portion, giving 333. Finally, dividing by ten makes the example 33.3, which cor-

responds to the 33.3 percent we want to display.

CONCLUSION

Adding a function to read text from an independent ASCII file (produced by a word processor, for example) and running a complete analysis would give this program greater utility; you could then use it to analyze any text file without having to type it into the program. That's a problem worthy of a future column.

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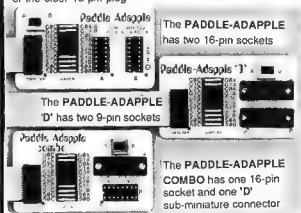
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The GS Monitor and Beyond

A look at the unique GS operating system—the monitor and two new versions of ProDOS.



by Tom Swan

Like all Apple IIs, the IIGS has a **monitor**—a group of routines with which you examine memory, create machine-language programs, list 65816 instructions, and perform a variety of other operations. Officially, the monitor isn't part of the GS Toolbox. Because it offers several unique commands, though, it's a sort of toolbox in its own right, with instruments that help you dissect your GS and learn what makes it run. And it's free, packed with every GS. If you don't know how to use it, you're not getting full value from your Apple.

To start the monitor, first run Applesoft BASIC by double clicking the BASIC.SYSTEM filename from the Program Launcher or the desktop. Next type CALL -151. You'll see an asterisk prompt (*), indicating that the monitor is working. You just *called*, or ran, a machine-language program at address -151, or \$FF69 in hexadecimal. You're now ready to type monitor commands.

To return to Applesoft from the monitor, type Q and press the return key, or type Control-C. Either command brings back the familiar square-bracket (!) Applesoft prompt.

Many monitor commands look best in an 80-column display, although you can use 40 columns if you prefer. Therefore, unless your display is a television set, which can't display 80-column text clearly, return to the square-bracket prompt and type PR#3. That puts your display into its 80-column format. Then type CALL -151 to restart the monitor.

GS MONITOR COMMANDS

There are two kinds of monitor commands: those that perform operations such as listing memory contents, and those that let you view or modify registers—special memory cells inside the 65816 microprocessor or other controller chips—or certain locations in memory.

While experimenting with these commands, you'd be wise to first put away your valuable disks. Remember that you're talking directly to the GS' innards, and, if you give it a strange command, the monitor may react unexpectedly. But don't let that frighten

you from trying. If you get stuck, press Control-Reset or turn your GS off and back on again, then start over. You won't do any harm.

Some monitor commands work on all Apple II computers; others work only on the GS. Missing from the GS (at no great loss) are the standard Apple II cassette-tape read (R) and write (W) commands. A few, such as Go (G), work identically to their original counterparts, but now accommodate the massive 16-megabyte GS address space.

Several other commands differ radically. For example, to run the mini-assembler on older Apples, you first start INTEGER BASIC by typing INT from Applesoft, then type CALL -151 and F666G. That procedure won't work on the GS, though. Instead, you simply type an exclamation point (!) to do the same thing.

The mini-assembler, a program with which you create short machine-language routines in memory, understands all 65816 microprocessor op (operation) codes—the values of its machine-language instructions. In a future column, I'll explain more about using the assembler.

From the monitor, type I to switch to inverse video when you want to give your eyes a break from the white-on-blue display. Type N to return it to normal.

Type =T to display the battery-powered clock's date and time. (Type a capital T—lowercase won't work.) You can do the same thing from the control panel—but typing =T is easier when you're using the monitor. To set the GS clock, after the T type another equal sign, followed by the date and time in this format:

=T=nn/dd/yy hh:mm:ss

Months (nn) must be in the range 1–12, the date (dd) 1–31, the year (yy) 0–99, hours (hh) 0–23, and minutes (mm) and seconds (ss) 0–59. You can use slashes and colons or any other nondigit characters between values except an apostrophe.

If you tire of the monitor's cursor, you can change it to another character by typing Control-^ and whatever character you want. To turn the cur-

sor off, type Control-^ and a space. To return to the standard cursor, type Control-^ and Delete. Control-Reset also restores the original cursor.

The cursor starts flashing when you change it to another character; apparently, there's no way to change it to a solid character. Whatever new character you choose remains until you change it again or press Control-Reset—even if you leave the monitor and return to Applesoft, or run another program.

VIEWING GS MEMORY

Perhaps the most interesting monitor commands are those with which you examine computer memory. To display a single memory location, just type its address. For example, type a zero to examine the first of many thousands of memory bytes. When I tried this, my GS displayed 00/0000:4C-L.

The first two digits are the bank number (any hexadecimal number from 00 to FF), which specifies one of 256 banks. Each bank refers to a unique 64K block of memory, for a total of 16 megabytes. If you don't type a bank number, the monitor uses the bank you specified previously.

The group of four hex digits after the slash stands for one of 65,536 (64K) memory addresses within a bank. After the colon is the hex value of the byte at this location (in this case, 4C), followed by a dash and that same byte value represented as an ASCII character, an L in the example.

The character, by the way, doesn't mean this value is part of a message or a string in memory. When the monitor lists memory bytes this way, it doesn't know the meaning of what it displays—it displays all potential ASCII values as characters and all others as periods. (See the **Figure**.)

To see more memory, just press the return key a few times. Your display resembles the **Figure**. The full-width (80-column) display lists 16 values at once (eight values if you're using a 40-column display). Notice that the monitor repeats each byte value as an ASCII character or period at the end of the line.

For a more readable experiment, and a pleasant surprise, type FF/BA00.BBDF. Stored at those locations in GS ROM are the names of a different group of characters—the human ones who wrote the GS software!

You can examine other blocks of memory by typing the general form bb/addr1.addr2, where bb is the bank number, addr1 is any starting

Figure. Press the return key to list consecutive memory locations.

```
00/00C0:F0 EF 38 E9 30 38 E9 D0-po8i08iP
00/00C8:60 80 4F C7 52 97 E1 00-^ .OGR.a.
00/00D0:08 20 01 00 00 00 00 74- . . . . .t
```

address in the bank, and addr2 is the last address you want to view. This sometimes displays more memory than you intended. In that case, type Control-S to pause and restart a long listing, or Control-X to stop and return to the monitor prompt.

The List command provides a different way to view memory. To see an example, type L and press Return. The resulting display lists the mnemonic form of machine-language instructions in memory. We'll see this command again when we examine the mini-assembler.

As you've discovered, the monitor lets you operate your GS on its lowest level—you can directly examine memory and other details in ways that are impossible with other methods. But the monitor is just one part of the total GS operating system, as the next section explains.

THE STORY OF DOS

Beginning with the system monitor as the Apple II's main controller, the disk-operating-system family tree branches from DOS 3.1, DOS 3.2, and DOS 3.3 to ProDOS (in several variations), Apple Pascal, and CP/M. Despite their differences, all have a similar purpose: running the computer's hardware—disk drives, keyboard, and display. They also load and run programs, which in turn issue commands back to the operating system to make the computer work.

ProDOS, which is distantly related to DOS 3.3 (and closely resembles Apple III SOS), is the choice of most Apple II owners today, as well as the required disk-operating system for most Apple II software.

The GS introduces two new family members, ProDOS 8 and ProDOS 16. Although related to earlier versions of ProDOS, these newcomers are more like second cousins than siblings. While their likenesses are obvious, their differences are striking.

ProDOS 8 is the GS' link to the past. This version, which runs on all Apple II computers, switches the GS to 8-bit-emulation mode, effectively turning it into a fast Ile.

ProDOS 16 runs only on the GS

and uses the computer's native 16-bit mode and new machine-language commands available in the 65816 processor. ProDOS 16 programs therefore can't run on other Apple IIs.

Conversely, programs that run under ProDOS 8 don't run under the newer ProDOS 16. To use the 50-cent phrase, ProDOS 16 isn't "upwardly compatible" with earlier operating-system versions. And, even worse, many earlier ProDOS programs don't run under the newer ProDOS 8. Even on the GS, for example, AppleWorks still requires the older ProDOS 1.1.1.

But there are similarities among ProDOS 8, ProDOS 16, and earlier operating-system versions. ProDOS 16 contains most of the old ProDOS commands, with similar methods of calling them. And, most important to all GS owners, all variations of ProDOS use the same disk format—each version can read and write another version's data files, even though they can't always run each other's programs. This is also true for Apple III SOS, which uses the same disk format as ProDOS.

ProDOS 16's ability to manage up to 16 megabytes of memory is its most important difference from other versions of ProDOS. Originally, ProDOS used a primitive bit map to keep track of memory usage. But to handle such sophisticated tasks as drawing windows, using fonts, and recognizing mouse clicks and other events, the newest version uses more advanced techniques.

ORGANIZING YOUR SYSTEM DISK

System-disk organization is probably one of the more confusing GS subjects among beginning programmers. But understanding these ProDOS fundamentals can help you. What is a system disk, and what must it contain? Which files can you remove safely from a system disk?

You first need to know that a system disk can be either complete or partial. The disk that came with your GS is an example of a complete system disk—it contains everything you need to run most kinds of Apple II software, including 8- and 16-bit pro-

grams. A complete system disk lets the computer decide which operating system it needs—you simply select the program you want to run.

An example of a partial disk is one that contains an application program, plus only the files, programs, tools, and data that program needs. Most programs you purchase come on partial system disks. Because such disks contain only the files the program needs, you might not be able to run other programs without first rebooting to a complete system.

The **Table** lists all the files that make up a complete system disk. An asterisk marks the files the GS requires for booting; inclusion of some (but not all) of the other files listed in the **Table** makes a partial system.

If you know the files your programs need, you can use the **Table** to determine the ones they don't need. For example, if you don't intend to run AppleSoft programs, remove BASIC.SYSTEM and save 10,752 bytes on disk. Creating a 16-bit boot disk by removing the ProDOS 8 file,

P8, from the SYSTEM/ folder saves another 16,384 bytes.

Let's create a minimum GS boot disk. First, make a copy of your complete system disk. Using the system utilities program—or another method if you prefer—remove all but the PRODOS and SYSTEM/ files.

In other words, a bare-bones GS system disk contains two items: the file PRODOS and a SYSTEM/ folder. Inside the SYSTEM/ folder, you need at least the following files and folders:

P16
START
TOOLS/
FONTS/
DESK.ACCTS/
SYSTEM.SETUP/
TOOL.SETUP

Technically speaking, the TOOLS/, FONTS/, and DESK.ACCTS/ folders are optional. (On the current system disk from Apple, FONTS/ and DESK.ACCTS/ are empty.) Most GS applications look for these folders, though; you should always include them in your minimum boot disk.

Despite its name, the PRODOS file doesn't contain the ProDOS operating system, as it does on other Apple IIs. On GS disks, PRODOS contains a program that decides which version of ProDOS other programs need. It then loads and runs the correct operating system—either P8 or P16—from the SYSTEM/ folder.

Therefore, you always need the PRODOS file, but you can remove either P8 or P16, depending on the operating system you need.

START is usually the Program Launcher from which you run ProDOS 16 programs. You can rename any other 16-bit program START, though, to create a turnkey disk—one that automatically runs a program when you boot it. Before renaming, make sure your program is type S16.

Names of most such programs—but not all—include the suffix .SYS16. For example, the name of the Apple Programmer's Workshop is APW.SYS16. The filetype, though, is S16, which the TYPE column lists as the hexadecimal value \$B3 when you use an 8-bit ProDOS to list a disk directory. It's important to understand that a file's type has nothing to do with its name, although most people use names, such as DEMO.SYS16, to help remind others what certain files contain.

Before it executes START, ProDOS runs the TOOL.SETUP program in the SYSTEM.SETUP/ folder. The setup program loads RAM-based tools and bug fixes that temporarily replace ROM tools every time you boot. You can remove two other programs from this folder, ATINIT and ATLOAD.0, to save another 8704 disk bytes. You need these files only if you connect your computer to an AppleTalk network.

DESKTOP MYSTERIES

While on the subject of organizing your system disk, I want to clear up another source of confusion. The file DESKTOP.SYS16 doesn't contain the desktop program, previously known as the Finder. The actual program and data files are in the DESKTOP/ folder. If you list a directory of that folder, you'll see the files:

Name	Type
SELECTOR	\$F1
DESKTOP1	SYS
DESKTOP2	\$F1
SELECTOR.LIST	\$F1
DESK.ACC	DIR

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Table. The complete GS system disk. Files marked with an asterisk are required for booting.

*PRODOS	Operating-system loader; automatically senses and loads ProDOS 8 (P8) or ProDOS 16 (P16)
*SYSTEM/ P8	Folder with the following files ProDOS 8 operating system
* P16	ProDOS 16 operating system
START	Any 16-bit program, but usually the Program Launcher; runs automatically after booting
LIBS/	Various system library files
TOOLS/	RAM-based tool sets
FONTS/	Character fonts
DRIVERS/	Device drivers
DESK.ACCS/	Desk accessories
* SYSTEM.SETUP/	Bootting automatically runs all program files in this folder
* TOOL.SETUP	Loads patches to ROM tools
BASIC.SYSTEM	Applesoft BASIC system interface program

DESKTOP1 contains the ProDOS 8 desktop program—not a 16-bit program, as you can see plainly from its

SY5 filetype. If it were a 16-bit program, its type would be \$B3 (or .S16 in APW). Files with type \$F1 are data

files and presumably contain various routines and other items associated with the desktop program.

Notice the DESK.ACC directory. A similar directory named DESK.ACCS is in your SYSTEM/ folder. These directories contain two different kinds of files. Desk accessories in the DESK-TOP/DESK.ACC folder are strictly for use by the 8-bit desktop program. Accessories in the SYSTEM/DESK.ACCS folder are for 16-bit programs, such as PaintWorks Plus.

That the GS desktop runs under ProDOS 8 and contains its own desk-accessory format suggests its life expectancy might be limited. I expect to see eventually a new 16-bit desktop that appears more like the Program Launcher and other GS applications. The question is, when? ■

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*Any parallel printer interface for Apple computers from Orange Micro, Apple Computer, Apricorn, Interactive Structures, Microtek, Practical Peripherals, Quadram, Street Electronics, Texptrix, Thirdware, Tiger and Wizard.

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Continued from p. 32
mouse aficionado, or anyone who likes bells, whistles, and desk accessories, will find a lot to like.

TINY BUTTONS

MouseWrite is a fine implementation of mouse-controlled word processing. Even mouse haters will admit that its menus and click-and-drag margins and tab ruler are convenient. Rodent rooters will appreciate its flexibility: It lets you specify whether starting to type will automatically delete selected text; when presenting options, it understands your intent when you click the mouse pointer near your chosen printer, command option, or whatever instead of hitting the tiny on-screen box exactly. (Window-sizing, closing, and scrolling boxes, though, are strictly for sharpshooters.)

Some features, happily, do more than clone MacWrite. "Delete Next Word" and "Delete to End of Line" commands let you save mouse-controlled text selection for larger cut, copy, and paste maneuvers—though

only the latter use MouseWrite's clipboard to offer an undo feature. The "About MouseWrite" option goes miles beyond citing the program author and version number: It shows the number of lines in your document and on the clipboard, the current and remaining portions of the 48K-maximum document size, a word count, and a rough estimate of your text's complexity or reading level.

You can also use the program without a mouse, though it's a little like doing your own dentistry. The escape key activates the menus, which you can navigate with the arrow and return keys. (It also backs out of most commands, but not all—it pulled down another menu when I tried leaving the find-and-replace option box with Escape instead of Open apple-5.)

The keyboard shortcuts are helpful, after some initial confusion—let's see, Control-D deletes a word, but I want Control-W to move to the next word, as opposed to Open apple-W to tog-

gle wide printing. Selecting text to cut or copy is surprisingly easy with an AppleWorks-style open-apple command. Still, you can't beat the mouse for margins and menus, and MouseWrite from the keyboard often feels a little awkward. Control-key cursor movement can be sluggish, watching the "Move" menu blinking on the top bar as the command is executed, and typing seems to slow as documents fill available memory.

BEYOND THE BASICS

While its ordinary features are adequate, MouseWrite earns extra credit for luxury touches. Besides reading ProDOS or even DOS 3.3 text files, the program imports AppleWorks word-processing files directly, translating commands for functions such as double spacing and underlining (though my AppleWorks files arrived with scattered groups of extra spaces between words, a quirk cured in the version due at press time).

It can save documents not only as ASCII text files, but as paragraphs, as long lines without extra carriage returns for easy telecommunication or direct transfer, or as "stationery pads"—what hightowns like Microsoft Word call style sheets: preformatted page layouts with optional text, such as your return address. Once you master a rather intricate shorthand syntax, you can store and load short glossary files of frequently typed text or menu-hopping macro commands.

MouseWrite uses mousetext characters instead of double-hires graphics, like that of StyleWare's MultiScribe, and its "what you see is what you get" performance is poor: You must give a command to see page breaks on screen; you can't see justification, just centering; and embedded formatting codes appear as either identical diamonds or, more helpfully, highlighted Bs for boldface and so on.

But MouseWrite offers a range of typesets, from underlining and subscripts to six colors (on an Apple Scribe, ImageWriter II, Prism, or Epson color printer), and can automatically put footnotes at the bottom of a page. ImageWriter, C. Itoh 8510, and some Epson owners can use their printers' ability to download a second font or character set; several are supplied, from Greek and Gothic to Pudgy and Colossal.

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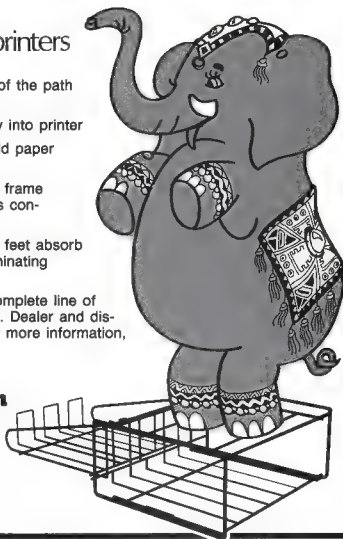
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tent mail merge, which can read items from a data file or pause for keyboard input. (Both merge and glossary files, lest you repeat my initial mistakes, must be in ASCII instead of MouseWrite format; you find yourself relying on the "Save As" command more often than the simpler "Save.")

ADVANCED ACCESSORIES

MouseWrite comes with both 5¼- and 3½-inch disks and can be copied to a hard disk, but it's most fun when installed for an "Expanded Desktop" similar to memory-card makers' AppleWorks enlargers. The program loads itself into a 384K (with spelling checker, 512K) RAM disk—either one created by software on an auxiliary-slot board or recognized by ProDOS on an Apple- or RamFactor-type card—in your specified slot. Once loaded, MouseWrite not only runs without disk access, but allows up to 12 open documents at once. You cycle through them from a pull-down menu, and can cut and paste between them without having to close one and open another.

Expanded Desktop operation is almost a necessity for the 60,000-word spelling checker, which works pretty well—letting you skip or delete a suspect word, add it to your dictionary, or choose from up to ten suggested corrections, though you must mark a word and come back to it instead of retyping on the spot. The tutorial, however, raised my suspicions when it defensively described the speller as, after all, faster than quitting MouseWrite and loading another checker from disk. That's true, but even on a RAM disk it's definitely slow.

The speller and DOS 3.3 file converter are two of MouseWrite's desk accessories, loaded from separate 5¼-inch disks or, on roomier media, directories. Another prints a chain of files named in an ASCII list; another loads BASIC.SYSTEM for access to Applesoft, or other programs that fit into the Apple's lower 64K, while MouseWrite temporarily retreats to auxiliary RAM.

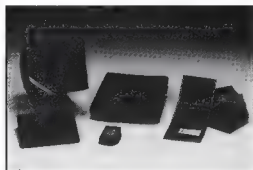
Perhaps the most convenient feature is a pop-up alarm clock, which is technically part of MouseWrite and not a desk accessory at all; perhaps the most shamelessly Mac-like is a magic-square puzzle, which locked up my system when I popped it over a document and then clicked on the latter's title bar without putting the puzzle

away first. My text reclaimed the foreground, hiding the puzzle so that I couldn't turn it off, but the puzzle stayed active, disabling the keyboard.

MouseWrite's desk accessories aren't in the class of Pinpoint's for AppleWorks, but there's one every word processor should have: a communications program that can dial from an eight-number directory and transfer files at 300 baud over a Hayes-compatible modem, through a ILC serial port, Super Serial Card, or

SSC equivalent in slot 2. (At press time, the publisher announced an up-grade supporting 1200 baud and the ILCs serial port, as well as fixing the puzzle crash and AppleWorks-import problems.)

The accessory is no match for a separate communications program; it doesn't bother with terminal emulation, automatic log-on macros, or binary protocols. Instead, there's a simple menu for sending the document on the desktop (as lines or



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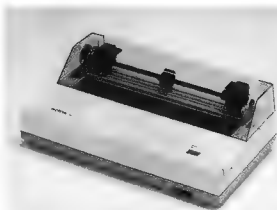
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paragraphs, with or without extra line-feeds), plus a menu for receiving or capturing text, another for setting data bits, stop bits, and parity, and so on. It won't download a program or log you onto NORAD, but it'll let you call a bulletin board, read your MCI Mail, or jump back to word processing while doing so. Between that and the ability to format ProDOS data disks, some users may not need any other software.

MouseWrite isn't the greatest word processor, but it's a good one, following and occasionally improving on the Mac interface and with terrific RAM-card support and communications. I also rate its cross-indexed, alphabetical reference manual highly, though the tutorial is almost too complete—there are enough sample files and mildly humorous lessons to keep you busy for a week. ■

Eric Grevstad
inCider staff



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Technically, the Brother is more an alternative to the original ImageWriter, a unit that's slower and less colorful than its replacement. Since Apple no longer manufactures the ImageWriter, the ImageWriter II is the new comparison standard among serial printers.

Compared with the ImageWriter II in terms of speed, the M-1109AP is unimpressive; its 75 characters per second (cps) lags far behind the ImageWriter II's whopping 250 cps (draft mode) or 180 cps (correspondence-quality mode). Even in near-letter-quality mode, the Brother seems sluggish at 19 cps, versus 45 for the ImageWriter II.

If you need high-speed printing, you may become impatient with the unit, which is slower than even some Epson printers I've used. But let's be practical—the perception of speed is what matters to most people. I didn't find the Brother's lack of speed distracting—even 19 cps is faster than my typing rate—and long printing bouts give me ample excuse to take a usually much-needed coffee break.

Color is another matter. If color printing is a high priority for you, don't bother to read further. Henry Ford could have been promoting the Brother M-1109AP instead of the Model T when he supposedly said you could have "any color as long as it's black."

ON THE INSIDE

The M-1109AP ribbon is peculiar in shape and installation. The rectangular ribbon cassette fits into a recess on the left side of the printer, under the removable cover. By grasping the plastic guide, which is part of the ribbon unit, you pull the fabric across the width of the platen and secure it in a holder on the right side of the printer. In operation, the printhead travels while the cassette remains stationary. The fabric itself cycles from the cassette to the guide and back again.

If you worry about the availability of these ribbons, your fears are partially justified. Unless your local computer or business-equipment store is a Brother dealer, it probably won't carry the M-1109AP ribbon. Glancing through computer-supply catalogues

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and magazine mail-order advertisements, though, I found at least five sources, with prices ranging from \$5.50 to \$11.95 each. Each ribbon is said to print half a million characters before giving up the ghost.

You can set up the printer in less than five minutes. A cable for connecting the Brother to your IIc is included in the package, and self-test software is built in.

Even if you have no experience with printers, using the M-1109AP will be second nature to you. The on/off rocker switch is conveniently located on the front of the printer. Power, check, on-line, line-feed, and NLQ touch-pad controls, each with its own LED indicator, are top-mounted.

DIP (dual in-line package) switches are somewhat awkwardly located under the ribbon and just in front of the platen on the right side of the printer. Changing them is a tolerable pain. Another Brother printer I use (the HR-10 daisywheel) has DIP switches more conveniently recessed in the back panel of the machine.

PUT IT ON PAPER

The good news is that the M-1109AP "thinks" it's an ImageWriter, so you'll only rarely have to fool around with DIP-switch settings anyway—at least if you're working in English. (There are seven alternate-language character sets available.)

Whenever a program asks you to set up your printer, just select "ImageWriter." I tested the Brother this way with a number of programs, including graphics packages: The Print Shop, Animate (both from Broderbund), Principal's Assistant (Mind-scape), and MultiScribe (StyleWare).

Programs that operate and print in text mode, such as AppleWorks 2.0 (Apple), Smart Money (Sierra On-Line), and Managing Your Money (MECA), also drove the unit as if it were an ImageWriter. In AppleWorks, the M-1109AP printed text superscripts and subscripts, standard text in various pitches, and boldface and underlining with no unpleasant surprises.

The Apple and Brother printers share similar vertical dot pitches and bit images and, as a result, similar graphics- and text-printing qualities. The Brother has a slightly larger buffer (3K versus the ImageWriter's 2K).

Though it may have the mind of an ImageWriter, the M-1109AP doesn't have its physique—it's much more compact (about 13 by 8 by 3 inches,

versus the ImageWriter's 17 by 12 by 5). The Brother is a lightweight (one-third the ImageWriter's nearly 25 pounds) and consumes less power (30 versus 180 watts when operating), too.

Packing less punch than the ImageWriter II, the Brother can print one original and two carbon copies, while the ImageWriter II can print an original and three copies. The Brother M-1109AP can handle single sheets or continuous-form paper. The tractor-

feed unit comes standard, and an optional roll-paper feeder is available.

The Brother carries a one-year warranty, an exceedingly pleasant variation from the standard Apple 90-day warranty. Unless a dealer in your state can handle repairs, however, you'll have to ship defective or broken units to service centers in Irvine, California, or Piscataway, New Jersey.

A Brother technical-support spokeswoman informed me that the M-1109AP can be interfaced with a IIc or Macin-

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tosh, but you must order custom cables from another manufacturer—Brother doesn't supply them. But if you use the ILC as the centerpiece of a portable system, or if your desk space is limited, there's one argument that's hard to beat: Brother's list price of \$349 (with ILC cable) is nearly \$300 less than the cost of an ImageWriter II and cable. If you're willing to sacrifice some speed and color printing, you should investigate this trim, hassle-free ImageWriter clone. ■

Cynthia E. Field
Wakefield, RI

Compiled BASICs Compared

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Micol Systems, 9 Lynch Road, Toronto, Ontario, Canada M2J 2V6, (416) 495-6864

Compiled BASIC language; II Plus or later, 64K, ProDOS \$89.95
Rating: ■■■■

ZBASIC

Zedcor Inc., 4500 East Speedway, Suite 22, Tucson, AZ 85712, (602) 881-8101

Compiled BASIC language; 128K IIe or ILC, DOS 3.3 \$89.95
Rating: ■■■■

Applesoft BASIC is an interpreted language: It translates program code into machine code one line at a time during execution. Although this lets you run a program without worrying about compiling or linking, it slows programs down, especially if they contain loops that must be called and translated repeatedly. A compiled language, by contrast, translates an entire file into machine code before running it. A compiled BASIC gives you most of the familiarity of Applesoft with much greater speed.

Of the three BASICs I tested for the Apple II, two—the Beagle Compiler and Micol BASIC—compile source files to an intermediate code requiring a run-time system to execute the pro-

grams. The third, ZBASIC, lets you compile a BASIC program to an executable file you can BRUN directly from disk.

The Beagle Compiler is a simple, elegant programming tool. With few exceptions—notably an "input anything" routine and a faster HPLLOT—the Beagle Compiler doesn't extend Applesoft. It just makes Applesoft programs run faster, a longtime goal of Apple programmers.

Micol and ZBASIC are more ambitious languages. Micol BASIC begins with Applesoft, but it doesn't simply compile programs. It provides a number of extensions to the language, giving it a rich set of control structures (WHILE/WEND, REPEAT/UNTIL, block IF/THEN/ELSE) that matches that of languages such as Pascal, noted for their emphasis on structure and modular programming. Micol BASIC is a good first step for students of programming who want to go beyond Applesoft. It also provides better debugging facilities than the Beagle Compiler.

Except that they're variations of the same language, ZBASIC has little in common with Applesoft. It's not a machine-specific language; ZBASIC compilers for different machines are designed to compile and run the same programs. You can develop and compile a program on an IBM PC, transfer the source code (the English-like statements translated by a compiler) to an Apple, and compile and run the same program with a minimum of fuss. ZBASIC is designed for people who are developing programs to run on a number of machines, under several operating systems.

APPLESOFT AND BEYOND

The three compilers have different degrees of compatibility with Applesoft BASIC. The Beagle Compiler is closest to Applesoft; programs require little or no modification to work. The list of Applesoft commands the Beagle Compiler doesn't include is short (CONT, DEL, LIST, LOAD, NOTRACE, RECALL, SAVE, SHLOAD, TRACE, and STORE) and consists mainly of obsolete commands (SHLOAD) or immediate commands (DEL, SAVE) that don't usually appear in programs.

Micol BASIC is derived from Applesoft, but uses different (and fewer) disk commands than those available to Applesoft through ProDOS. It exhibits incompatibilities in some other commands, particularly HTAB, VTAB,

and HPLLOT. On the other hand, Micol BASIC contains extensions to Applesoft that give you more control structures. Micol BASIC also supports procedures with local variables, letting you build a library of procedures and incorporate them into your programs as needed. It's a more complete language than Applesoft.

Like Micol BASIC, ZBASIC has many more control structures than Applesoft, including WHILE/WEND, DO/UNTIL, and a "LONG/IF" resembling a block IF/THEN/ELSE. Unlike the Micol and Beagle products, however, ZBASIC requires you to make extensive modifications to Applesoft programs. Since the language supports a variety of micros, its graphics and disk commands, screen formatting, and other machine-dependent features are entirely different from Applesoft's. Only general statements such as PRINT, INPUT, FOR/NEXT, and the like remain the same.

ENVIRONMENTS FOR DEVELOPMENT

Compilers and their attendant utilities are program-development tools. In addition to making programs run faster, compilers should provide an environment that makes writing and testing programs easy.

Of the three reviewed here, ZBASIC provides the best development environment. Entering programs with the editor was clean and simple; typing RUN, I compiled and executed the program in memory in seconds. If the program had a bug, I performed traces, set break points, or single-stepped through the program. Applesoft incompatibilities aside, ZBASIC would be the perfect combination of good environment and powerful language, if only it produced faster code.

Micol BASIC also provides an editor, but I didn't like it: It was simply too tedious. For example, to delete program line 30, I had to enter D 30 (Return), then press Return again after a "Line deleted" message. In addition, the editor cleared the screen after most commands. I found myself entering L (for list) much more often than should have been necessary.

Micol BASIC isn't interactive. You can type RUN from the editor to execute a file, but you'll first have to answer a number of prompts and watch a great deal of disk action as the compiler, linker, and finally the run-time library are loaded into memory.

Micol Systems could have made the system interactive by making the compiler reside in memory, but since the compiler takes 32K and the editor fills about 10K, you wouldn't have much room for your programs.

The Beagle Compiler is nearly as interactive as ZBASIC, except that you have to save a file and run it from disk to compile it. The Beagle Compiler doesn't provide any special editor for entering programs; it uses the standard Applesoft environment. While I have no love for Applesoft's editing capabilities, for most programmers it's a familiar environment in which to work. All the compilers tested here let you use other editors to enter programs if you prefer.

BEAT THE CLOCK

I ran five simple benchmark programs with each compiler and with plain Applesoft to test string handling, file access, floating-point handling, built-in functions, and graphics. Since I did the timings by hand, I used loops with many iterations (up to 2000) to minimize the errors inherent in stopwatch timing. Of course, this introduces a bias into the tests, favoring programs that loop quickly. I like this bias, though, since programs without loops generally don't take long to execute, anyway.

The results of my tests appear in the **Table**. No compiler finished first in all categories, but the Beagle Compiler proved generally the best performer, with times averaging around twice as fast (and occasionally four times as fast) as Applesoft's. Micol BASIC also did well, averaging about one and a half times the interpreter's speed—except when it came to file handling, where it was twice as slow as Applesoft.

ZBASIC was all over the place. Although it zipped through floating-point calculations (albeit to four decimal places only) and handled strings smartly, it was slow in file handling—probably because it runs under DOS 3.3, while the others use ProDOS—and plainly awful drawing horizontal lines and calling built-in functions. Although I programmed the graphics test to take account of the difference between ZBASIC's device-independent graphics and the Apple's hi-res screen, ZBASIC isn't a fast graphics language, although it contains more graphics primitives, such as CIRCLE and BOX, than the other systems. I

Table. Compiled-BASIC benchmarks (times in seconds).

Test	Applesoft	Beagle	Micol	ZBASIC
String	24	6	15	10
File	43	20	93	144
Float Point	46	25	32	12
Functions	53	50	42	475
Graph	78	24	50	140

can't explain why it took eight minutes to make 1000 calls each to its TAN and INT functions.

OTHER CONSIDERATIONS

Speed is important, but so are size and the ability of a compiled program to run outside the developmental environment. ZBASIC is the only compiler I tested that created a BRUNable file on disk, but it added about 20K to the size of the programs I compiled. Also, the ZBASIC programs I ran as stand-alone applications rebooted my system when they finished running. Finally, although I didn't compare loading times in the benchmarks, a ZBASIC program spread across 80 or 90 sectors of a DOS 3.3 disk takes a long time to load.

Micol BASIC and the Beagle Compiler both install run-time systems to run previously compiled programs. The Micol library is about 11K, while Beagle's COMPILER.SYSTEM is more than 17K. The latter, though, lets you run standard Applesoft and binary files, including system files, while installed; the Micol library preempts your machine and lets you run only compiled programs. As for actual code size, Beagle's compiler produced smaller code than Micol's.

All three systems let you chain programs and access machine-language subroutines. Both the Beagle Compiler and Micol BASIC support the Applesoft ampersand function, although you have to modify your machine-language routines to use them if they pass parameters. I also had access to a preliminary version of an upgraded Beagle Compiler that lets you store string variables and arrays in extended memory if your Apple is so equipped. This function mimics a similar Applesoft utility found on Beagle Bros' Extra K disk.

ZBASIC has the best documentation. The Micol BASIC manual is good, but it could use a larger index.

The Beagle manual is the skimpiest of the three, simply because it doesn't have to document a language; it merely describes the operation of the compiler.

Overall, you can't beat the Beagle Compiler for pure performance—it's the best Applesoft compiler available. Micol BASIC is a good language that gives Applesoft many advanced features, but it's hampered by an unfriendly operating environment; it needs an editor/compiler/linker as good as the language itself. ZBASIC's operating environment is excellent, but the language doesn't sit well on the Apple II. Perhaps the ProDOS version, under development at press time, will cure some of its performance problems in machine-dependent areas; in the meantime, its main appeal remains program portability.

Robert M. Ryan
Sharon, NH

Editor's note: At press time, Zedcor's Greg Branche was completing the long-awaited ProDOS ZBASIC, which will run on the II Plus as well as the IIe and IIc—the \$49.95 introductory price will include both 64K and 128K versions. According to Branche, the new ZBASIC supports ProDOS subdirectories and double-hi-res color graphics, directly addresses the Apple's expansion slots, and executes BSAVE and BLOAD commands faster. A planned GS version will support super-hi-res graphics. Micol Systems is also preparing a GS version of Micol BASIC, featuring a full-screen editor, and will offer upgrades to owners of the 8-bit version. ■

NEW PRODUCTS

edited by Lafe Low

Software

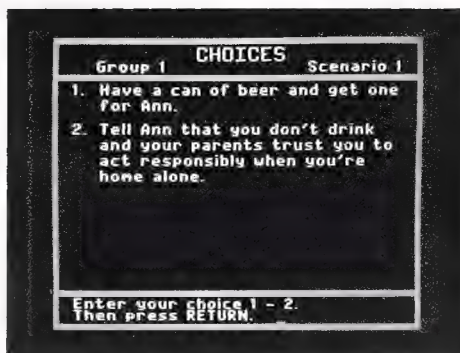
READING RIGHT

Test your students' **reading comprehension** and give them instant feedback on test scores with The Accelerated Reader. This program helps readers at all levels improve their skills—gifted students are challenged, average students improve, and remedial students learn the basics. The Accelerated Reader automatically scores each child, tracks individual and group scores, and handles administrative work. The program is offered on a 30-day preview basis; if you're not satisfied, you can simply re-

turn it. The Accelerated Reader package retails for \$300 from Readup Inc., P.O. Box 95, Port Edwards, WI 54469, (715) 887-2333. For more information, circle Reader Service number 354.

PASCAL FOR THE GS

Pascal programmers who want to take advantage of the capabilities of the Apple IIgs can now explore **Kyan Pascal/GS**. This new version of the ProDOS-based programming language includes a 65C816 native-code compiler, full-screen text editor, and programming utilities. Its extensions to standard Pascal range from graphics and string handling to include files and object-module chaining, as well as full access to the Apple's ROM-based tools.



Marshware's two-disk Drugs series simulates the choices facing students and helps them practice saying no.

A built-in macro assembler lets users add in-line assembly source code to their Pascal programs.

Kyan Pascal/GS requires 512K of memory, is non-copy-protected, and includes Kyan's KIX hard-disk manager and UNIX-like operating environment for ProDOS 16. The language costs \$99.95, from Kyan Software, 1850 Union Street, #183, San Francisco, CA 94123, (415) 626-2080. For more information, circle Reader Service number 365.

DRUG AWARENESS

Marshware's two new programs teach students how and why to **say no to drugs**. The first in the series, *Drugs: Their Effects on You*, covers commonly used drugs, their effects, and techniques for resisting peer pressure. A quiz portion tests you on what you've learned. An accompanying program, *Drugs: Who's In Control?*, gives students a chance to practice their peer-pressure-resistance skills. Students work in groups to role play and make decisions about drugs. Each program comes with teaching guide, operating instructions, program overview, and dictionary to help teachers plan its use. These drug-education programs sell for \$49.95 each from Marshware, P.O. Box 8082, Shawnee Mission, KS 66208, (800) 821-8082. For more information, circle Reader Service number 352.

Readup's Accelerated Reader package includes comprehension tests on disk, plus teacher's manual, wall chart, book list, and T-shirt.



PACIFIC THEATER

Recreate **naval battles of World War II** in War in the South Pacific. This semi-real-time simulation lets you choose from the Battle of the Coral Sea in May 1942, the Marines' invasion of Guadalcanal in August 1942, and Japan's counter-attack in October of that year. Each scenario plays to the beginning of March 1943. You control more than 400 ships, 17 types of aircraft, and numerous infantry units. Command the fleet in War in the South Pacific for \$59.95, from Strategic Simulations Inc., 1046 North Rengstorff Avenue, Mountain View, CA 94043, (415) 964-1353. For more information circle Reader Service number 356.

Hardware

SOPHISTICATED GAMING

The Mach IV joystick performs the functions of a mouse, as well. It provides a ring of precision motion in the first 20 percent of its range for exact pointing; the rest of the stroke is a high-speed ring for rapid, controlled movement.

A
cus-



tom integrated chip senses when joystick movement is slowing down and brakes the motion to prevent overshoot. Flip a switch, and the Mach IV becomes a multibutton joystick for games. Trim tabs and variable action controls make it adaptable to any purpose. This IIe- and IIc-compatible unit works with all Apple game-port and mouse software. The Mach IV costs \$89.95 from CH Products, 1225 Stone Drive, San Marcos, CA 92069, (619) 744-8546. Circle Reader Service number 360 for more information.

KEEP YOUR MODEM INSIDE

The Smartmodem 1200A, Hayes' new **internal 1200-baud modem** for the Apple II, II Plus, IIe, or IIgs, features progress monitoring, rotary and 16 DTMF or PABX dialing commands, convenient redialing, built-in test modes, and a full implementation of the standard Hayes "AT" command set. Three DIP switches are located on the top of the modem for easy access. A new version of Smartcom I software supports auto-dial/auto-answer, file management, variable data format, concurrent file capture, directory display, and file transfer through

The Mach IV joystick provides mouse function, as well.



The scooter Touch Pad discharges static electricity to protect you and your equipment.

Hayes, Xmodem, Stop/Start, and Send Lines protocols. The Smartmodem 1200A sells for \$439. Smartcom I is sold separately for \$119 from Hayes Microcomputer Products, P.O. Box 105203, Atlanta, GA 30348, (404) 449-8791. For more information, circle Reader Service number 359.

HIGH-SPEED MODEM

The Courier HST modem can transmit data at speeds of up to 9600 bps on voice-grade, dial-up telephone circuits. It provides full-duplex communication through an asymmetrical frequency division of telephone channels, allowing simultaneous 9600- and 300-baud data channels. An error- and data-flow-control protocol lets the Courier HST transmit up to 1100 error-free characters per second over local and long-distance telephone circuits. The modem uses an extended version of the standard "AT" command set and works with most popular communications

software. It retails for \$995 from U.S. Robotics, 8100 North McCormick Boulevard, Skokie, IL 60076, (312) 982-5010. For more information, circle Reader Service number 362.

DON'T GET ZAPPED

Protect yourself and your equipment from **static electricity**. The Scooter STP10 Anti-Static Touch Pad has a pressure-sensitive backing that mounts on any work surface. The fully conductive front panel is attached to ten feet of cord with a banana plug or alligator clip for easy connection to any ground. You simply touch the pad before working on your computer for positive grounding and static discharge. The Touch Pad sells for \$12.95 from Ohm Electronics, 746 Vermont Street, Palatine, IL 60067, (312) 359-6040. For more information, circle Reader Service number 358.

Product descriptions contained in this section are based on information supplied to us by the respective manufacturers. These announcements are provided solely as a service to our readers and do not constitute endorsement by inCider of any given product.

PACK OF PRINTERS

Juki has a new fleet of **printers** to meet a variety of needs. The Juki 6200 letter-quality (\$810) prints at 30 characters per second, using a 96-character Dia-blo-compatible plastic daisy-wheel. Its 3K print buffer is expandable to 15K. For larger businesses, the Juki 6300 runs at a faster 40 cps and sells for \$1080. Both models offer 10, 12, and 15 pitch, proportional spacing, quiet operation, and a variety of print options.

The Juki 7100 (\$1795) is the company's first 24-pin dot-matrix color printer, offering speeds of 83 to 100 cps in LQ mode and 250 to 300 cps in draft mode.

The 7100 accepts fabric, multistrike, and color ribbons. It comes with a standard 7K buffer and accommodates a bidirectional tractor, single-, dual-, and triple-bin sheet feeders, and a variable font card. An enhanced color-matrix printer, the 7200 (\$2445), adds front and rear paper loading for alternating between continuous and cut-sheet forms without removing the paper. It prints at 90 to 108 cps in LQ mode and 270 to 324 cps in draft mode. For more information, contact Juki Office Machine Corporation, 20437 South Western Avenue, Torrance, CA 90501, (800) 325-6134, or circle Reader Service number 361.

Product Updates

● Mindscape has introduced a **Thunder Mountain** division, which will offer software titles at a retail price of \$9.95 each. Many have been previously released by other publishers or proven successful in European markets but never released in the United States. Thunder Mountain titles include **Voodoo Island**, **Mr. Pixel's Cartoon Kit** and **Programming Paint Set**, **Cyrus Chess**, and **Songwriter**. Contact the Thunder Mountain division of Mindscape at 3444 Dundee Road, Northbrook, IL 60062, (612) 452-4730.

● Also appearing for the first time in the U.S. are five new entertainment titles from Datasoft. From PSS in England, three new games include **Tobruk**, a tank simulation of the desert war in North Africa, **Bismarck**, in which you try to sink Germany's prize battleship, and **Swords & Sorcery**,

a fantasy role-playing game. Datasoft has also licensed **Saracen**, an arcade-style adventure from France, and **Black Magic**, another arcade adventure from an independent team of developers in Canada. Contact Datasoft (Intelli-Creations) at 19808 Nordhoff Place, Chatsworth, CA 91311, (818) 866-5922.

● Manzanita Software has lowered the price of **The Business Accountant**, its four-module accounting package. System Manager, General Ledger, Accounts Payable, Accounts Receivable, and Inventory Control packages now sell for \$495, reduced from a combined price of \$1275. The **Payroll** add-on module, which previously cost \$345, is now \$195. Manzanita is located at One SierraGate Plaza, Suite 200-A, Roseville, CA 95678, (916) 781-3880.

Reader Service	Page	Reader Service	Page
70 ACE Computer Company	108	226 Jacobsen Software	82
* AST Research	CV2, 1	121 K-12 MicroMed a	
* Applied Engineering		109 Publishing	109
21, 34, 35, 42, 43, 51, 53,		181 Kensington Microware	CV4
61, 62, 63, 66, 67		6 Master Media Supply	109
20 Atlas Computer Supply	109	263 Megahaus	39
14 Azure Mountain Products	108	98 NEXO Distributor	108
176 BTE Computers, Inc.	86	167 Nine to Five Software	102
229 Beagle Bros	73	119 Orange Micro	87
225 Black Sun	109	120 Orange Circle	6
71 Borg Industries	108	77 PIE	108
149 Brickhouse Software	108	43 Pacific Technologies	109
* Business Computers		129 Pandora Software	109
of Peterborough	56, 57	276 PinPoint Pub	49
236 CMS Enhancements, Inc.	91	29 Precision Data Products	82
116 CSPWGE	100	* Preferred Computing	33
60 Central Point Software	32	50 ProComp	54
62 Central Point Software	15	49 Prof. Jones	105
266 Cheatsheet Products	98	128 Programs Plus	78, 79
227 Cheatmate Technology	69	136 Quality Computer	47
79 Colt Valley Computers	41	16 Quinsept	110
124 CompuServe	23	188 Redmond Cable	68
296 Computer Cover	89	165 Roger Coats	14
111 Computer Direct	106, 107	84 Sensible Software	19
142 Computers Plus Company	108	30 Signum Micro Systems	109
76 Computist	103	143 Silicon Express	74
271 Cyborg, Inc.	48	218 Sir-Tech Software	7
134 Dayton Computer Supply	110	232 Soft-Byte	68
187 Demco Electronics	90	292 Soft Disk	98
184 Digital Vision	87	47 Software Simplified	105
108 Diversified Software		217 Software Touch, The	27
Research	104	* Southern California	
275 Dresselhaus	30	Research Group	83
148 Electronic Arts	4	38 Spectral Graphics	12
82 Elfware	110	160 Strategic Simulations	29
201 EPYX	13	73 Street Electronics	28
202 EPYX	64	156 subLOGIC Corp.	31
11 Fastfind	108	252 Telematix	110
295 Funk Software	25	282 Tevox	99
146 Golem Computers	80	53 The Enhancers	108
186 Grand Union Micro Systems	88	140 Timeworks	11
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2	12	17	22	152	157	162	167	172	302	307	312	317	322	
3	8	13	18	23	153	158	163	168	173	303	308	313	318	323
4	9	14	19	24	154	159	164	169	174	304	309	314	319	324
5	10	15	20	25	155	160	165	170	175	305	310	315	320	325
26	31	36	41	46	176	181	186	191	196	326	331	336	341	346
27	32	37	42	47	177	182	187	192	197	327	332	337	342	347
28	33	38	43	48	178	183	188	193	198	328	333	338	343	348
29	34	39	44	49	179	184	189	194	199	329	334	339	344	349
30	35	40	45	50	180	185	190	195	200	330	335	340	345	350
51	56	61	66	71	201	206	211	216	221	351	356	361	366	371
52	57	62	67	72	202	207	212	217	222	352	357	362	367	372
53	58	63	68	73	203	208	213	218	223	353	358	363	368	373
54	59	64	69	74	204	209	214	219	224	354	359	364	369	374
55	60	65	70	75	205	210	215	220	225	355	360	365	370	375
76	81	86	91	96	226	231	236	241	246	376	381	386	391	396
77	82	87	92	97	227	232	237	242	247	377	382	387	392	397
78	83	88	93	98	228	233	238	243	248	378	383	388	393	398
79	84	89	94	99	229	234	239	244	249	379	384	389	394	399
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101	106	111	116	121	251	256	261	266	271					
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104	109	114	119	124	254	259	264	269	274					
105	110	115	120	125	255	260	265	270	275					
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128	133	138	143	148	278	283	288	293	298					
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2	12	17	22	152	157	162	167	172	302	307	312	317	322	
3	8	13	18	23	153	158	163	168	173	303	308	313	318	323
4	9	14	19	24	154	159	164	169	174	304	309	314	319	324
5	10	15	20	25	155	160	165	170	175	305	310	315	320	325
26	31	36	41	46	176	181	186	191	196	326	331	336	341	346
27	32	37	42	47	177	182	187	192	197	327	332	337	342	347
28	33	38	43	48	178	183	188	193	198	328	333	338	343	348
29	34	39	44	49	179	184	189	194	199	329	334	339	344	349
30	35	40	45	50	180	185	190	195	200	330	335	340	345	350
51	56	61	66	71	201	206	211	216	221	351	356	361	366	371
52	57	62	67	72	202	207	212	217	222	352	357	362	367	372
53	58	63	68	73	203	208	213	218	223	353	358	363	368	373
54	59	64	69	74	204	209	214	219	224	354	359	364	369	374
55	60	65	70	75	205	210	215	220	225	355	360	365	370	375
76	81	86	91	96	226	231	236	241	246	376	381	386	391	396
77	82	87	92	97	227	232	237	242	247	377	382	387	392	397
78	83	88	93	98	228	233	238	243	248	378	383	388	393	398
79	84	89	94	99	229	234	239	244	249	379	384	389	394	399
80	85	90	95	100	230	235	240	245	250	380	385	390	395	400
101	106	111	116	121	251	256	261	266	271					
102	107	112	117	122	252	257	262	267	272					
103	108	113	118	123	253	258	263	268	273					
104	109	114	119	124	254	259	264	269	274					
105	110	115	120	125	255	260	265	270	275					
126	131	136	141	146	276	281	286	291	296					
127	132	137	142	147	277	282	287	292	297					
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 THE APPLE II MAGAZINE

Arcade Realism



"Game designers are coming up with more realistic-looking worlds through better programming."

by Scott Mace

Combine the realism of Flight Simulator with the action of Pac-Man, and you have the beginnings of a new type of entertainment software that could offer the most exciting gaming ever.

Imagine playing a game of intrigue set in San Francisco. As you dash through the city to escape your foe, the maze of streets unfolds as it does in reality. Then imagine playing the game another time and choosing a different city—maybe one you don't know, but have to learn as you play.

ALMOST 3-D

While that's not yet a real game, it's the type that will emerge eventually from this new category. We need more of this action-reality genre, and I've found some games that already indicate what the future could bring.

The first is Dan Gorlin's **Airheart**, from Broderbund Software (17 Paul Drive, San Rafael, CA 94903, 415-479-1700, \$34.95). Gorlin is a seasoned designer whose *Choplifter* for the Apple II became the first home-computer game ever turned into an arcade game (although many arcade games have been converted to home-computer games).

Airheart is Gorlin's finest achievement. While you pilot a helicopter in *Choplifter* through two dimensions (up-down and left-right), in *Airheart* you pilot a small boat in 2½ dimensions (add away-towards).



Infiltrator: helicopter action and a secret mission

You can't call it three dimensions unless your boat leaps off the screen—but the animation is so good, it practically does anyway.

Your mission is to retrieve three objects: a sword, a goblet, and a harp. On a seemingly limitless expanse of ocean, you follow a glinting beacon to the objects' hiding places. Maneuvering over and under the surface of the water in your submersible craft, you must defeat robot guardians that come after you in ever-increasing numbers.

With double-hi-res animation, Gorlin makes your small boat and other animated figures quite realistic. For instance, your guides appear to hover in midair in long, flowing robes and gesture smoothly as they instruct you. And when you finally storm a hiding place, you, as the pilot, jump out of the boat, climb down, and reemerge with the prize.

You'll be amazed at the way the waves ripple under your boat as you jet around this world. But don't gape too long, or some fiendish foe will hit you before you know it.

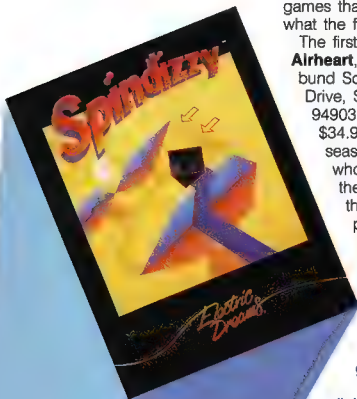
ROLLING-BALL PUZZLES

Spindizzy, from Electric Dreams (2350 Bayshore Frontage Road, Mountain

View, CA 94043, 415-960-0410, \$34.95), is more abstract than *Airheart*, but uses the same 2½-D approach. If you've seen Electronic Arts' **Marble Madness** (2755 Campus Drive, San Mateo, CA 94403, 415-571-7171, \$34.95), currently available for some non-Apple micros and promised at press time for the Apple II by this spring, you'll recognize *Spindizzy* as another game that harks back to those aggravating roll-the-ball-without-landing-in-the-hole puzzles kids used to get for Christmas before video games were invented.

The *Spindizzy* world consists of almost 400 different screens, strung together in a maze-like map on which you can view your overall progress. The object is to cover as much ground and gather as many hidden jewels as you can. One thing I like about this game is that covering ground itself adds to the time you have left to complete the game. Many games just reward you when you get the goodies, however you got there.

Spindizzy is one tough game. Your path leads you down tilted catwalks, forcing you to balance carefully as you use the joystick to make your way. Sometimes



Spindizzy: rolling-ball puzzles in almost 3-D.

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CID 5



MACE ON GAMES

you must leap from one catwalk to another and press the fire button for extra acceleration and deceleration. Whenever you fall off a precipice, you start again from that point, but that's small consolation as you crawl tile by tile through the maze.

You control a spinning top or a marble, and the laws of physics apply: You can ricochet off walls, and friction slows down your spinner.

Because Spindizzy's world is all bits and bytes, programmer John Sander-son can make rolling-ball puzzles that never before appeared under any Christ-mas tree—because they're almost physically impossible and certainly too expensive to mass-produce.

and follow an on-ground spy mission involving sleeping gas, phony papers, cameras, and explosives. It's action-packed software that tells a story, to boot.

CONTROLLING REALITY

The next logical step would be to give the player control over physical reality, by letting you alter the factors controlling the game. Spindizzy would be even more fascinating if you could vary the amount of gravity and friction to which the game subjects your spinner. Infiltrator would benefit from the addition of more weapon systems. All the programmer would need is a computer with a bit more memory and processing power, such as the Apple IIas.

Game designers are also coming up with more realistic-looking worlds through better programming. A year ago, Epyx (600 Galveston Drive, Redwood City, CA 94063, 415-366-0606) released two programs developed by Lucasfilm's software division. **Kronis Rift** and **The Eldolon** (see Game Room, May 1986, p. 106, \$29-39, dealer-determined) were the first Apple II games to make extensive use of fractal graphics.

Fractals are geometric phenomena generated by a complex set of mathematical equations. They produce startlingly realistic screen formations, such as the mountains and caves seen in the Lucasfilm adventures. Keep an eye on them—they're leading-edge examples of the kinds of action games you can expect to see in the next few years. ■

Scott Mace is editor and publisher of Microcosm, a monthly newsletter on computer games. You can write him at 6510 Copper Ridge Drive #T-1, Baltimore, MD 21209.

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Multicolumn Text

by John E. Holwell

Judith Classen's method of printing three labels across within AppleWorks (Letters, November 1986, p. 10) is ingenious. After reading her letter, though, I realized you could use a similar method to print text in multicolumn format.

Print a justified, single-column-sized word-processor document to disk and retrieve it as a database to turn each column line into a database record. Print the database to disk as a DIF file, then retrieve it as a spreadsheet to move the data and arrange them in any number of columns. Printing this spreadsheet to the clipboard and converting it to a word-processor document are the final steps.

Once you've formatted it and placed it into a word-processor document, you can add headers and other features (underlining, boldface, and so on) as described in the November 1986 AppleWorks in Action (p. 120).

FORMATTING THE DOCUMENT

Here's a more detailed description of this process: Use OA-O to format the final word-processor document. First set left and right margins (LM and RM) to zero. Set characters per inch (CI) to ten (default when printed to disk). Set the platen width (PW) to the desired number of characters per column divided by ten, and set for justified printing (JU).

AppleWorks displays the format (without justification) on screen. Now review your document to see whether you like the new format. Correct lines that are spread out (they'll appear

short on screen) by inserting hyphens (followed by a space) where appropriate to break long words. Print your document to see the justified copy.

When you're satisfied with the format, print the document to disk as an ASCII file. You can adjust the way AppleWorks prints to disk to include a carriage return after each line by creating a new label format (option 3 on the Report menu).

Create a database from this text file (option 2 from the Database menu) and set the number of categories to one. This database now contains each line of text as a sequential record. Delete any blank lines resulting from text that's longer than the page length of the word-processor document. Press OA-P to create a new table format. Create a single column to the exact length of the file (the right-justification will be apparent). Then print the document to disk as a DIF file.

SETTING UP THE COLUMNS

Create a new spreadsheet file from this DIF file. The document now appears as a single column under A. Change this column's layout to increase its width to show the entire right-justified text. Go to the bottom of the spreadsheet to determine the number of lines of text. Divide the total number of lines by the number of columns you want and relocate the text into alternating columns with AppleWorks' copy and delete options.

Let's say you have 90 lines and want to print them in three columns. Place the cursor on cell A61 and copy to the end of the document. Move the cursor to cell E1, press Return to copy the third column of text to the desired location, and return the cursor to cell A61. Since AppleWorks has copied this text, delete the remaining text. Then move the cursor to cell A31 and copy the second third of the text to column C. You now have to format the column widths (columns of text and the spaces between columns). Insert a blank column on the left whose width represents the margin you want.

Next, set the left and right margins (LM and RM) to zero. Set characters per inch (CI) to the desired format,

set the platen width (PW) to the calculated overall width, and turn off the headers (PH).

BACK TO THE WORD PROCESSOR

Print this report (all or a block) to the clipboard, verifying that the information identified and your printer-option values represent the same number of characters.

Create a new word-processor document. Set left and right margins to zero, characters per inch to the desired final format, platen width to the calculated overall width, and set for unjustified margins.

Move the clipboard text to this document (OA-M). The screen (limited to 80 characters per line) may not be easy to read, but a hardcopy will tell you if all your calculations are correct. ■

Write to John Holwell at 2297 Sedgwick Avenue, Bronx, NY 10468.

ProWriter Print Options

by Tony Hubbs

Print Options (see the **Table and Listing 1**), for the C. Itoh ProWriter 8510 dot-matrix printer, makes it easy to access that machine's many features.

The program lets you easily choose among pica, elite, or compressed pitch (10, 12, or 17 characters per inch); proportional spacing; enlarged, boldface, or underlined text; 1/4- or 1/2-inch linefeeds; forward or reverse custom linefeeds in 1/44-inch increments to 1/44 inch; and uni- or bidirectional printing. Print Options also lets you set the left-margin indentation and choose Greek characters or graphics symbols. Selecting standard characters returns you to that character set.

If you choose proportional spacing when printing justified text, though, your text won't print with an even right margin, since proportionally printed characters aren't the same width.

Choosing enlarged type doubles the size of the type you're using, printing pica type in 5 cpi, and enlarged elite in 6 cpi. Enlarged type also works with compressed pitch and proportional spacing. Cancelling enlarged print returns the printer to its



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HINTS/TECHNIQUES

Table. ProWriter print-options program description.

Lines	Description
100-360	Display a list of print options.
370-430	Let you input your selection from the menu and set the printer.
440 and 450	Let you test your selected print option, then return output to the video display.
460-480	Ask if you want to select more commands from the menu.
490-980	Send print commands to the printer.

Listing 1. ProWriter 8510 print options.

```

100 TEXT : HOME
110 PRINT "1. PICA PITCH"
120 PRINT "2. ELITE PITCH"
130 PRINT "3. COMPRESSED TYPE"
140 PRINT "4. PROPORTIONAL SPACE"
150 PRINT "5. ENLARGED TYPE"
160 PRINT "6. CANCEL ENLARGED TYPE"
170 PRINT "7. BOLDFACE TYPE"
180 PRINT "8. CANCEL BOLDFACE TYPE"
190 PRINT "9. UNDERLINE"
200 PRINT "10. CANCEL UNDERLINE"
210 PRINT "11. 1/6 LINE FEED"
220 PRINT "12. 1/8 LINE FEED"
230 PRINT "13. CUSTOM LINE FEED"
240 PRINT "14. FORWARD LINE FEED"
250 PRINT "15. REVERSE LINE FEED"
260 PRINT "16. UNIDIRECTIONAL"
270 PRINT "17. BIDIRECTIONAL"
280 PRINT "18. SET LEFT MARGIN"
290 PRINT "HIT RETURN TO SEE MORE PRINT OPTIONS."
300 INPUT A$
310 TEXT : HOME :
320 PRINT "19. GREEK ALPHABET"
330 PRINT "20. GRAPHIC SYMBOLS"
340 PRINT "21. NORMAL CHARACTERS"
350 PRINT "22. INCREMENTAL PRINT MODE"
360 PRINT "23. LOGIC PRINT MODE"
370 VTAB 20
380 PRINT "CHOOSE THE NUMBER";
390 INPUT A$
400 A = VAL (A$): IF A < 1 OR A > 24 THEN 370
410 HOME
420 PR# 1
430 ON A GOSUB 490,520,530,540,550,560,570,580,590,600,610,6
20,630,600,810,820,830,850,930,940,950,960,970
440 PRINT "TEST TEST TEST TEST TEST"
450 PR# 0
460 INPUT "ANOTHER COMMAND(Y/N)";Y$: IF LEFT$(Y$,1) = "Y" THEN
RUN
470 IF LEFT$(Y$,1) < > "N" THEN 460
480 END
490 PR# 1
500 PRINT CHR$(27); CHR$(78)
510 RETURN
520 PRINT CHR$(27); CHR$(69): RETURN
530 PRINT CHR$(27); CHR$(81): RETURN
540 PRINT CHR$(27); CHR$(80): RETURN
550 PRINT CHR$(14): RETURN
560 PRINT CHR$(15): RETURN
570 PRINT CHR$(27); CHR$(33): RETURN
580 PRINT CHR$(27); CHR$(34): RETURN
590 PRINT CHR$(27); CHR$(88): RETURN
600 PRINT CHR$(27); CHR$(89): RETURN

```

Listing continued

Listing continued

```

610 PRINT CHR$(27); CHR$(65): PRINT "TEST TEST TEST TEST
    TEST": RETURN
620 PRINT CHR$(27); CHR$(66): PRINT "TEST TEST TEST TEST
    TEST": RETURN
630 PR# 0
640 HOME
650 PRINT "THE LINE FEED WILL BE IN A FRACTION OF"
660 PRINT "144. YOU JUST INPUT THE FIRST NUMBER"
670 PRINT "OF THE FRACTION. FOR EXAMPLE IF YOU"
680 PRINT "WANT 45/144 YOU JUST TYPE 45."
690 PRINT "IF YOU WANT 1/2 INCH YOU TYPE 72 BECAUSE"
700 PRINT "72 IS HALF OF 144. YOU MUST USE"
710 PRINT "TWO DIGITS IN THIS FORM:"
720 PRINT "1 WOULD BE 01 AND 45 WOULD BE 45. THE"
730 PRINT "MAXIMUM NUMBER IS 99."
740 INPUT "LINE FEED?";L$
750 IF LEN(L$) < > 2 THEN 640
760 PR# 1
770 PRINT CHR$(27); CHR$(94);L$
780 PRINT "TEST TEST TEST TEST TEST"
790 RETURN
800 PRINT CHR$(27); CHR$(102): RETURN
810 PRINT CHR$(27); CHR$(114): RETURN
820 PRINT CHR$(27); CHR$(62): RETURN
830 PRINT CHR$(27); CHR$(60)
840 RETURN
850 PR# 0
860 PRINT "INPUT THE LEFT MARGINS IN HOW MANY"
870 PRINT "CHARACTERS YOU WANT TO INDENT IN THIS": PRINT "FO
    RM 000. 1 WOULD BE 001, AND 10 WOULD: PRINT "BE 010"
880 INPUT "LEFT MARGIN: ";LMS
890 IF LEN(LMS) < > 3 THEN 860
900 PR# 1
910 PRINT CHR$(27); CHR$(76);LMS
920 RETURN
930 PRINT CHR$(27); CHR$(38): RETURN
940 PRINT CHR$(27); CHR$(35): RETURN
950 PRINT CHR$(27); CHR$(36): RETURN
960 PRINT CHR$(27); CHR$(91): RETURN
970 PRINT CHR$(27); CHR$(93): RETURN
980 END

```

End of Listing

former pitch setting. Boldface printing doesn't affect pitch, but slows your printer because it double-strikes each character.

The ProWriter 8510 is set for 1/4-inch linefeed (single-spaced mode) when you turn it on. Option 12 lets you choose 1/4-inch linefeeds for tighter spacing.

Option 13 lets you set linefeeds from 1/4-inch to 3/4-inch. Enter the linefeed setting in two digits. For example, for a 3/4-inch linefeed, type 01; for a 1/4-inch linefeed, type 72. You can also set your ProWriter for forward or reverse linefeeds, for printing fractions, superscripts, and subscripts.

To set the left margin, type in the number of characters you want to indent from the paper's left edge.

Incremental printing produces characters as the printer receives them, and returns the printhead to home position when you press Return. In logic-print mode, the printer stores characters in its buffer until it receives either a print command (such as a carriage return) or an entire line of data. Logic-print mode prints bidirectionally at high speed, the ProWriter's standard print mode. ■

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HINTS/TECHNIQUES

Three-Line Hex/Dec Conversion

by Cliff Harris

Hexadecimal/decimal conversion programs don't have to be long and complex. The converters presented here are different: The program in **Listing 2** uses only three lines to convert hexadecimal numbers to decimal and decimal to hex, while the conversion program in **Listing 3** accepts and displays negative decimal numbers (such as -151), and even converts 16-bit numbers.

Listing 3 is an extended version of **Listing 2**, and is made up of subroutines you can use as modules in other programs. The conversion subroutines are expanded here to make them easier to read, but you can condense them into a single line, as in **Listing 2**.

If you use the hex/dec converter as a subroutine, set variable A to zero (line 400) before converting numbers; set HX\$ to null (line 600) before each call if you use the dec/hex converter as a subroutine. Lines 500-540 calculate the length of the final hex string;

Listing 2. Three-line hex/dec-dec/hex converter.

```
10 TEXT : HOME : INPUT "ENTER A NUMBER TO CONVERT (HEX WITH
  '$')":N$:N = VAL(N$): IF LEFT$(N$,1) = "$" THEN 30
20 FOR I = 3 TO 0 STEP -1:N(I+1) = INT(N/16^I):N =
  N - (16^I)*N(I+1):HX$ = HX$ + MID$("0123456789AB
  CDEF",N(I+1)+1,1): NEXT I: PRINT HX$: END
30 FOR J = 1 TO LEN(N$) - 1:K = ASC(RIGHT$(N$,J)):A =
  A + 16^(J-1)*(K-48-7*(K>60)): NEXT J:PRINT
  A
```

Listing 3. Expanded hex/dec-dec/hex converter.

```
10 REM CLIFF HARRIS
20 REM BOX 4343
30 REM ANAHEIM, CA 92803
40 REM (714) 535-6704
50 REM
90 REM ***** GET INPUT
100 ONERR GOTO 990
110 TEXT : HOME
120 INVERSE :A$ = "HEX<-->DEC": GOSUB 900
130 VTAB 10: PRINT "ENTER A NUMBER TO CONVERT (HEX WITH '$')
  "
140 INPUT "":N$
150 IF LEFT$(N$,1) = "$" THEN 200
160 N = VAL(N$)
170 IF N < 0 THEN N = N + 65536:Q = N: GOTO 300
180 Q = N - 65536:R = N: GOTO 300
190 REM ***** OUTPUT HEX --> DEC
200 GOSUB 400
210 VTAB 17: CALL - 868: PRINT N$ = "":A:
220 IF A < 65536 THEN PRINT "":A - 65536
230 PRINT
240 GOTO 999
290 REM ***** OUTPUT DEC --> HEX
300 GOSUB 500
310 VTAB 17: CALL - 868: PRINT N$: " = "":
320 IF Q < 65536 AND R < 65536 THEN PRINT Q: " = "":
330 PRINT "$":HX$
340 GOTO 999
390 REM ***** HEX --> DEC CONVERTER
400 A = 0
410 FOR J = 1 TO LEN(N$) - 1
420 K = ASC(RIGHT$(N$,J))
430 A = A + 16^(J-1)*(K-48-7*(K>60))
440 NEXT J
450 RETURN
490 REM ***** DEC --> HEX CONVERTER
500 A = N
```

Listing continued.

Listing continued.

```

510 FOR B = 1 TO 8
520 A = A / 16
530 IF A < 1 THEN Z = B - 1: B = 8
540 NEXT B
600 HX$ = ""
610 FOR I = Z TO 0 STEP - 1
620 N(I + 1) = INT (N / 16 ^ I)
630 N = N - (16 ^ I) * N(I + 1)
640 HX$ = HX$ + MID$ ("0123456789ABCDEF", N(I + 1) + 1, 1)
650 NEXT I
660 RETURN
899 REM ***** MISC STUFF
900 HTAB 21 - LEN (A$) / 2: PRINT A$: NORMAL: RETURN
990 VTAB 17: PRINT CHR$ (7): "SORRY, I CAN'T HANDLE THAT NUM
BER": GOTO 130
999 VTAB 23: END
1000 REM MAX = 4,294,967,295 = $FFFF FFFF
1010 REM = $3B9A C9FF = 999,999,999
1020 REM = -65536 = $0

```

End of Listing.

if you want to fix this length, delete lines 500-540 and set variable Z in line 610 to one less than the length of the hex string. For example, if the biggest number you'll convert is 65535 (\$FFFF), which requires four

hex digits, set Z to three (see line 20 in Listing 2).

Line 900 centers a string on the 40-column screen. The NORMAL command lets you display the string as inverse or flashing characters (see

line 120), then exit, restoring the usual screen.

Listing 3 converts decimal numbers up to 4,294,967,295 (see lines 1000-1020). You could convert larger numbers by increasing the value of B in lines 510 and 530. The biggest hex number you can enter is \$3B9A C9FF; you can convert numbers greater than this, but Applesoft displays them in scientific notation. (You can correct this by converting the number to a string, but such a maneuver makes the program more complicated.) The largest negative number you can enter is -65536, which equals \$0000. ■

Write to Cliff Harris at Box 4343, Anaheim, CA 92803.

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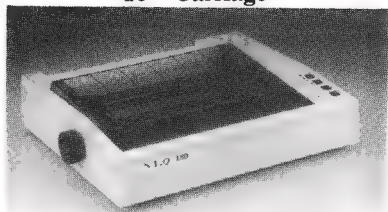
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Bank Street Writer Goes to Graduate School

In 1983, after deciding that existing programs' unfriendliness was skewing a study of how word processing affects students' writing, New York's Bank Street College of Education broke into the software business with a deliberately low-powered, simpler word processor. Kids (and some business execs) jumped at the chance to write on screen without having to memorize commands, and **Bank Street Writer** was on the way to fame.

Today, though, the original Writer looks as if it's been left back in school a few times while the world moves on to higher grades. Most users have Ile or Iic systems with 128K and 80 columns; AppleWorks is barging into classrooms as well as beating up home and business competitors; and even a child knows you shouldn't have to stop writing and call a menu to move the cursor.

It's time for a new version of the program, one that's much more powerful, but even easier to use—one with grownup features, such as a spelling checker, that a second-grader can use without looking at the manual. Actually, it's time for two essentially similar versions: Broderbund's **Bank Street Writer Plus** for civilians and Scholastic's **Bank Street Writer III** for schools, cointwinners of *inCider's* Incredibly Improved Product Award.

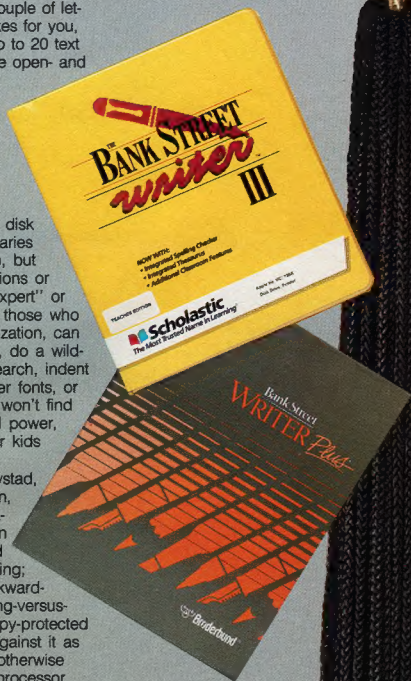
The new Writer starts with the same boot-and-write display as the old, though in your choice of 40 or 80 columns and with a full complement of cursor-movement commands. As before, you call editing functions (other than simple deletions) and disk and printing commands from a menu toggled with the escape key—but the 1987 menu is a swank set of pull-down windows, controlled by moving the cursor and pressing Return, by typing the first letter of a menu or sub-menu choice, or by dragging a

mouse. If Escape and a couple of letters are too many keystrokes for you, power users can assign up to 20 text or command macros to the open- and solid-apple keys and 1 through 0.

Commands range from undoing a move or deletion to displaying a handy word count, along with a first-class spelling checker and thesaurus—awfully slow on a 5¼-inch disk (you can copy the dictionaries to a 3½-inch or hard disk), but deft at suggesting corrections or synonyms. The added "expert" or apple-key commands, for those who don't mind a little memorization, can spell-check a single word, do a wild-card or anagram word search, indent a quotation, change printer fonts, or pop up a calculator. You won't find WordPerfect's professional power, but the Writer isn't just for kids anymore.

Review Editor Eric Grevstad, who hated the first version, calls BSW Plus/III "a pleasure. It gets you started in seconds, but doesn't hold you back once you're going; it really minimizes the awkwardness of the modular writing-versus-editing approach. Any copy-protected program has one strike against it as an adult application, but otherwise BSW is a genuine word processor that happens to be incredibly easy."

Bank Street Writer Plus costs \$79.95 from Broderbund Software (17 Paul Drive, San Rafael, CA 94903). Bank Street Writer III is \$99.95 from Scholastic Software (730 Broadway, New York, NY 10003); the extra \$20 brings a classroom-oriented manual, teacher's utilities such as the ability to enter customized prompts or instructions, and a separate disk with an adorable, fully functional 20-column Writer for youngsters or special-needs students. ■



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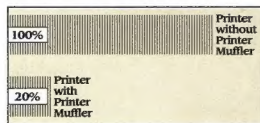
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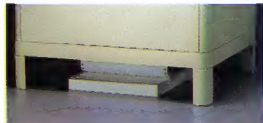
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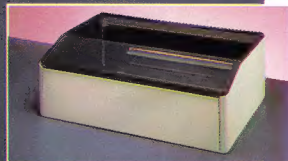
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